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18 November 2026

Gendered academia

Inequality and inclusiveness in changing Italian academic governance

Edited by
Maria Carmela Agodi, Adele Lauria, Ilenia Picardi



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Maria Carmela Agodi, Adele Lauria, Ilenia Picardi

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The gender dimension in academic and research careers:
some proposals towards inclusiveness
Working group on Career Evaluation in Research and academia of the Italian National Conference of University Equal Opportunities Bodies *111*

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Foreword

Tindara Addabbo[1]

Gender equality in academia is a key priority since the 2012 EC European Research Area Communication, however gender inequalities in academic career have been shown to be persistent with evidence of both horizontal and vertical segregation (European Commission, 2019).
The 2020 EC European Research Area Communication shows a strengthened commitment for gender equality in Research and Innovation. One tangible sign can be seen in the requirement of Gender Equality Plan to access Horizon Europe funding in fact, for calls with deadlines in 2022 and onwards, the Gender Equality Plan becomes an eligibility criterion to access to Horizon Europe funding.
The EC (2021) in the General Annexes to Horizon Europe 2021-2022 work programme recommend, to comply with the eligibility criterion, amongst the 5 areas to be addressed in the gender equality plan also:

- gender balance in leadership and decision-making;
- gender equality in recruitment and career progression.

Notwithstanding the priority recognized to gender equality in ERA still one can observe persistent gender inequalities in research performing organizations.
Indeed, women are less likely to be in full professor positions and to receive tenure. According to the first data available from the European Commission Infographics anticipating the 2021 EC She Figures report, in 2018 women represent 42.3% of academic staff but, according to the DG R&I women in science database while they are 47.1% in grade D their share in grade A is 26.2%. According to the same set of data only 23.6% of the heads of higher education institutions are women. According to She Figures 2018 data, differently from some other EU countries, Italy is characterized by a large difference in the proportions of tertiary educated women and men working as professionals at the disadvantage of women (65.7 % men, 57% women). Turning to the presence of women in grade A positions in different sectors it emerges that in the different areas women are less likely to be in full professor positions with the lowest share in Engineering and technology (12%), Medical sciences (14.6%) and Agricultural Sciences (17.5%) and the highest, but still well below men's, in Humanities (36.5%).

Tab. 1. Proportion (%) of women among grade A staff by main field of R&D, 2016

	IT	EU-28
NS	22,7	18,1
ET	12,1	12
MS	14,6	27,5
AS	17,5	25,5
SS	25,7	28,1
HU	36,5	32,5

NS = natural sciences; ET = engineering and technology; MS = medical sciences;
AS= agricultural sciences; SS = social sciences; H = humanities.
Source: selection from European Commission (2019) Table 6.2

A substantial share of the observed gender gap in tenure at the disadvantage of women in different disciplines remains unexplained by differences in research productivity or in the department characteristics as shown for instance by Weisshaar (2017) in her analysis on Sociology, Computer

[1] Full Professor of Economic Policy at the University of Modena and Reggio Emilia, President of the National Conference of the Italian Universities Equal Opportunities Bodies.

Science, and English disciplines across research universities attributing the observed inequalities in tenure rates to the gendered inequality in tenure evaluation processes.
We do believe that, without addressing the determinants of gender inequalities in academia with proper actions (that should then be subjected to gender impact evaluation) RPOs are bound to reproduce inequalities with a high cost for those who work and study in universities and, more in general, for the society as a whole for firms and other organizations that find themselves in shortage of personnel with a tangible cost in terms of lower growth in the short and long run and with the cost of not achieved justice.
International and national institutions must be aware that individuals are not equally subject to the costs of gender inequalities in academia in terms of lack of justice and also in terms of not being able, due to social and cultural constraints, stereotypes and expected labour market discrimination to invest in the fields of education that would allow them to acquire skills in sectors with better employment probabilities and/or in line with their capabilities often not even recognized.
The volume Gender and inclusivity in Italian Academia allows to analyse in depth the extension of gender segregation in Italian research performing organizations with a wide focus in terms of disciplines but also with attention to the actions that can be proposed in order to tackle the persistent inequalities. On this regard the Conference of Equal Opportunities Bodies of Italian Universities' proposals approved in the 2020 by the Annual conference are also shared here for a wider dissemination and discussion.

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European Commission (2021) Horizon Europe 2021-2022 work programme, General Annexes, https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/wp-call/2021-2022/wp-13-general-annexes_horizon-2021-2022_en.pdf

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Introduction

Maria Carmela Agodi, Adele Lauria, Ilenia Picardi[2]

In research institutes and universities, equality between men and women is generally perceived as an achieved goal. However, gender studies in science and academia attest to the persistence of a gender gap in science.

The well-known scissor diagram in academic careers (Figure 1) highlights this gap in vertical segregation, pointing to the asymmetry registered in the distribution by gender in apical positions (the so-called glass ceiling). However, at the same time, it has the limitation of bringing the data relating to different cohorts into a synchronic dimension. It could make the gender gap observed in the more advanced positions interpreted as the legacy of a past in which access to higher education was strongly differentiated by gender, so one might think that it would be sufficient to wait for the outcome of the exit of the old cohorts and the completion of the career trajectories of the new ones to see a slow but inexorable shift towards gender equality.

However, a more detailed analysis of the research teaching staff in the Italian academy shows that this is not the case. Actually, accurate analysis of research careers after the changes induced by Law 240/2010, known as the Gelmini Reform (Picardi, 2019) has shown a new range of academic trajectories precisely in correspondence with what can be considered the main "gateway" to the academic permanent staff in the Italian university, as reconfigured by the Gelmini Law, i.e., the location of RTDB. The higher percentage of female researchers in the role abolished by Law 240/2010 signals the relative tendency of women to remain in this position compared to male colleagues who, in a higher percentage, become Full Professors.

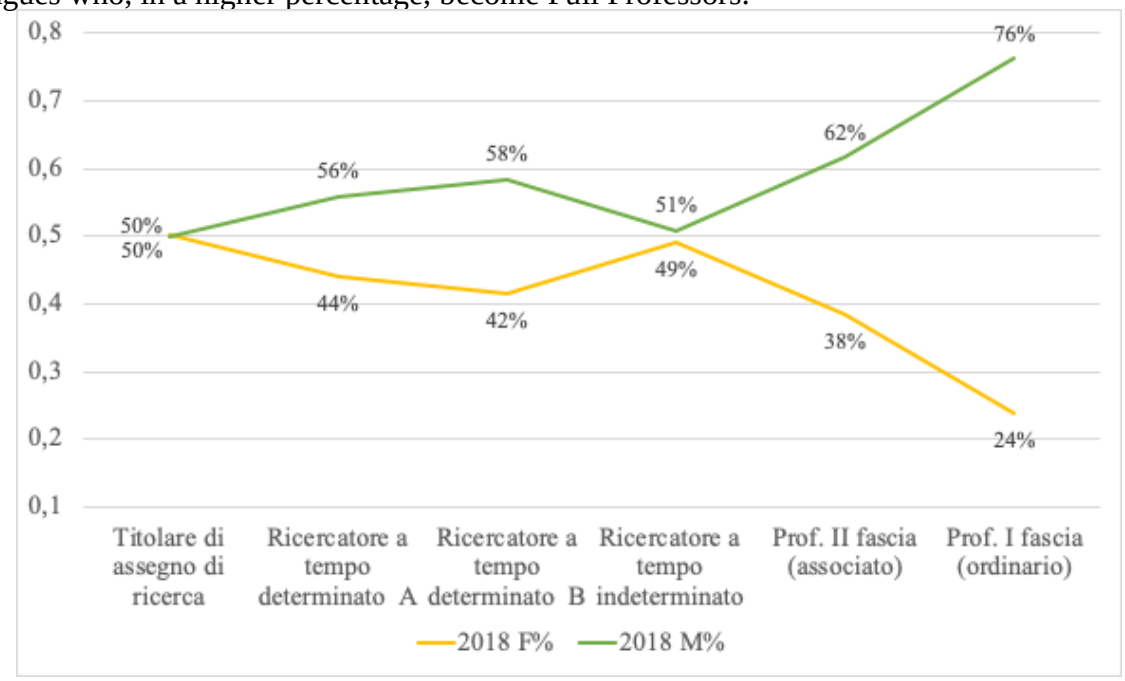


Figure 1. The academic scissors of academic careers in Italy (MIUR data, 2019, Picardi, 2020)

Issues of gender equity are not a thing of the past and have resurfaced in recent years, precisely in the entry phases of the Italian academy. The work of Joan Acker, the American sociologist considered one of the most eminent personalities within gender and feminist studies, is relevant to understand what is at stake in this process. In1990, she published an article entitled *Hierarchies, Jobs, Bodies: A Theory of Gendered Organizations*, which revealed the gendered nature of work organizations, achieved through what the author defined as gendering processes, i.e., processes that create gender-based differentiations in organizations and scientific institutions.

[2] Gender Observatory of university and research of University of Naples Federico II

Gendering processes are not *invariant* in time and space: on the contrary, they are highly variable and take different forms in different contexts and at different times. Some comparative research has shown how these are expressed differently in different cultural and organizational contexts and how they can change as the same contexts vary (Caitriona et at., 2019). Recent studies have also assessed the differential impact of the COVID-19 pandemic on gender equality in higher education institutions, showing how the pandemic constituted a critical point, a moment of significant change for academic institutions, exacerbating some of the pre-existing gender inequalities and introducing new ones, by changing practices in teaching, conducting research, and sharing knowledge (Malisch et al., 2020; Nash & Churchill, 2020; The Lancet, 2020). Gender inequalities in academia and research do not concern only the asymmetry in the distribution of top positions - the so-called glass ceiling. Recent research, instead, reveals many invisible barriers along career paths, producing gender inequalities. That's why the metaphor of glass labyrinths has been introduced to represent the multiple gender structures that intervene in the construction of academic and scientific pathways (Picardi, 2020). The metaphor provides an iconographic representation of the multiple gendered structures intervening in the construction of academic and scientific pathways more easily accessible. Actually, in recent years, the gender studies literature has focused attention on the study of practices through which the gender order is structured in institutions and organizations. This approach conceptualize gender itself as the result of situated social practices enacted in social interaction. Gender practices are in discourses, symbols, how people talk about concepts, and their behaviours. In this perspective, universities, academia, and research centres are gendered organizations where so-called gendering processes are in place, i.e., processes that create differentiations based on gender. The study and reconstruction of the glass labyrinths reveal the gendered structures that the subjects encounter while doing science and being scientists. The visualization and recognition of these structures, therefore, constitutes a fundamental step for the development of greater gender awareness within scientific institutions and, above all, allows us to think about possible actions to be taken to renegotiate the inclusiveness of academy and research, while overcoming approaches that have shown inadequate to deal with the problematic nature of the issue.
This volume offers reflections on how the gendering processes implemented in our daily practices contribute to making academia and research institutes *gendered organizations*.

The contribution by Maria Cristina Antonucci proposes a study on the effects of the university reform introduced in Italy in 2010, particularly in the field of social sciences. The study shows how the gender gap that characterizes the various academic roles tends to increase with a further decrease in the percentage number of women in top positions. It also shows a greater difficulty entering the university system for young women. This observation is even more serious considering that the changes above imply, in the future, the reduction of the female point of view in the scientific field under consideration.

In the work of Monia Anzavino and Annalisa Dordoni, the academic production gap is examined from a gender perspective, with a particular focus on generational differences. This analysis focuses, in particular, on the introduction of the Gelmini law in which the scientific qualification is obtained on the basis not only of the quality but also of the quantity of the scientific products of the candidates. Taking into consideration scientific production understood as monographs, articles, or volumes, in all academic areas, the authors show that there is indeed a productivity gap linked to gender and accentuated for the younger generations, going so far as to demonstrate that in the academy, few women who successfully build their careers are those who reach the male standards that define excellence in the academic world.

Barbara Barbieri, Cristina Cabras, Ester Cois, and Silvia De Simone describe the implementation of the first Italian Gender Equality Plan at the University of Cagliari. This GEP was approved In July 2020 and realized in the framework of the European project H2020 Supera (Supporting the Promotion

of Gender Equality in Research and Academia). It proposes to invest in gender inclusiveness and fight the existing asymmetries in career paths. The authors, starting from the resistances that so big task determines, give a detailed description of the set of activities included in the main project that has been proposed.

Through the contribution of biographical interviews, Federica d'Isanto, Maria Rosaria Masullo and Grazia Barone analyse the phenomenon of gender discrimination in the field of physical sciences to discover hidden dimensions of the phenomenon of discrimination. The women interviewed are workers at the National Institute of Nuclear Physics. What emerges from the interviews reported is a subtle but not negligible difference between men and women in the emotional aspect of experiencing work: women feel driven to obscure their female identity to push it towards a recognized attitude of male identity. Women, therefore, seem to face a double obstacle: the gender to which they belong and the drive to conform to attitudes recognized by the institution.

In her work, Arianna Montorsi analysed two evaluation processes adopted in the Italian academy to assign research funding (VQR, 2004-2010) and to decide the progression in career (ASN, 2012- 2013) in terms of gender. The comparison of the chosen criteria shows, in both cases, to favour the male gender. By a further analysis, the author demonstrates that the results depend on the choice of the parameters: for example, instead to take into consideration the number of the publications, the results change in favour of the female gender when considering the ratio between the number of quality publications and the total number of publications.

Rosy Musumeci, in her contribution, analysed, from a sociological and gender perspective, the scientific careers at the University of Turin (Italy), in the period immediately before the introduction of Gelmini's Law (L. 240/2010) and nowadays, with a focus on the trends regarding the new positions as temporary researchers introduced by Gelmini's Law. Despite of results showing a small reduction of the gender gap for associate and full professors, the glass ceiling persists. Women are the majority in the first phases of the academic career – among degree students, PhDs, research fellows and pre-reform researchers – while they are the minority among associate and especially full professors and in the key governance roles.

Cristina Quartararo and Elisabetta Ruspini started from the Gender Equality Report, published in 2019, reporting data relative to Milano Bicocca University to analyse the state of inclusion of women in Italian higher education institutions and highlights the role played by the Gender Equality Report as a key tool for gender equality policies. Moreover, they describe the specific case of the University of Milano-Bicocca describing the implementation of good practices around gender.

Marco Serino and Ilenia Picardi discuss gender and academic status inequalities analysing the composition of the committees of Italian top-ranked sociology journals and investigating gender, academic position and the geographical area of affiliation of their members. Inequalities do matter in the networks formed by joint memberships in journal boards, within which scholars may hold more or less advantageous or powerful positions. The findings show that few women with high academic status, along with several less established researchers, occupy leading positions within these journal boards and in the related network, while male, academically prominent scholars (working mainly in institutions located in Italy's northern or central regions) are the dominant figures. Therefore, women and less established scholars, as well as those who are affiliated with institutions located in Southern Italy, seem to be largely excluded from accumulation of symbolic capital associated with memberships in these journal boards, nor are they able to benefit from the related social capital.

In conclusion, the volume reports the document *The gender dimension in academic and research careers: some proposals towards inclusiveness***,** approved during the Annual Conference of the

National Conference of the Italian Universities Equal Opportunities Bodies “Smart Academia. Assessment, work, well-being and fairness in changing university” (Politecnico di Milano, 3 - 4 December 2020). The document, elaborated by the working group on Career Evaluation in Research and academia of the National Conference of Equality Bodies of Italian Universities, reports some policy proposals aimed at achieving more outstanding gender balance in careers at academic and research institutions should aim to act on the intertwining of factors listed above.

Vertical segregation in the Italian academic system. A case study on Sociology, before and after the 2010 Italian University Reform

Maria Cristina Antonucci

Abstract

The introduction of academic reform in Italy in 2010 (law 240/2010) introduced relevant changes in university governance, in the organization of research and teaching activities, in the access to and development of academic careers. Even if the reform does not refer to the gender-equal opportunities for access and progression of careers, recent literature showed how this law marked the female presence in academic careers, especially at top-level positions. This paper examines the reform impact in vertical segregation in Italian academic sociology. The selected area of studies traditionally measures and discusses gender differences and female participation in work, power, economy, and society. A reduction of female academics in this sector, especially at top-level positions, might affect the relevance of gender studies in Italian universities.

Furthermore, a female perspective on social issues has always been crucial for diversity in science and it will be even more necessary in the post-pandemic recovery time. Consequently, an impact of the mechanism of selection and progression on the female stock of sociology academics might be relevant for the continuation and progression of gender studies and for a female oriented sociological perspective in society. Through an analysis based on open data, publicly provided by the Italian Ministry of University, this paper assesses the vertical segregation hypothesis in the academic careers of Italian sociology, using two indexes (Glass Ceiling Index, GCI, and Progression Glass Ceiling Index, PGCI) to measure vertical segregation in all the levels of academic careers, before and after the 2010 reform law. Data emerging from the analysis confirm when a reform does not expressly provide positive measures to guarantee equal opportunities for women, it creates a negative impact on the leaky pipeline in the whole academic system and even in sectors, like sociology, which should be familiar to equal opportunities and affirmative policies.

1. Background analysis: women in academic sociology: context and research perspectives

It has often been supposed that in the scientific careers of the science and humanities sector, the "gap" (EU Commission, 2000) which identifies gender differences from the completion of the academic study path in the sector is smaller compared to the STEM disciplines access to different degrees (from initial to intermediate up to the top) of the academic and research career. Contrary to the STEM sectors, where there is still a more limited presence of girls in university studies (horizontal segregation), access to post-graduate careers in science, university and research in SH disciplines has a lower impact on horizontal segregation, while vertical segregation occurs over time in both academic, scientific and research careers (Palomba, 2006; Avveduto Piscane, 2014; Sala Bosisio, 2017; Zacchia, 2017; Roberto Re Maglio, 2019; Avveduto, 2020). In its broadest and interdisciplinary sense, the gender dimension in academic careers has been the subject, in addition to numerous institutional interventions at European level (EU Commission 2000, 2009, 2011, 2019), of a series of statistical surveys, necessary to detect nature and dimension of the phenomenon of gender segregation in scientific careers globally (Osborn, 2000; Baker, 2012; Evans 2014, Solera Musumeci 2017), European (Bagilhole Goode 2001; Goastellec Pekari, 2013; European Commission, 2018) and Italian (Sala Bosisio, 2017; De Paola Ponzo Scoppa, 2018). Some studies referred to the different gender outcomes of academic careers, based on a lack of reference to the dimension of meritocracy, often invoked but less practiced, in evaluating access and professional development opportunities (Bagilhole Goode, 2001; Nielsen, 2015; Poggio, 2018). In this sense, they have provided an adequate description of the framing of the gender and career theme, referring to the adoption of informal

behavioral models within the academy, capable of falling outside the quality standards of research and merit assessment.

Other contributions (Ginther Kahn 2006, 2014; Winslow Davis, 2016; Marini Meschitti, 2018) have highlighted the specificity of the academic gender dimension in social sciences, in which limits on access to careers now almost geared to gender equality ("Plateau") for the development of a career for women, in fact, in the form of vertical segregation. These phenomena appear more clearly by looking not so much at the stock of personnel (with indicators such as the feminization rate of a scientific sector), but by applying indicators of progress in careers such as the Glass Ceiling Index and the Progressive Glass Ceiling Index, capable of returning the greater or lesser difficulty, for men and women, in the transition from a professional access position to a top position.

Further contributions, specific to Italy, analysed the question. Baccini (2014) build up the first dataset on discrimination of women in the process of national scientific qualification. De Paola, Ponzo, Scoppa (2018), Bagues, Sylos Labini, Zinovyeva (2014) studies the perspective of the glass ceiling and leaky pipeline in Italian academic careers, noticing how those factors prevented the full advancement of women in universities.

Roberto, Rey, and Maglio (2019) revealed that the national academic system could be defined as a gendered construction, in which gender under-representation in careers occurs mainly in the transition to the top of the academic career (Solera Musumeci, 2017). Further interesting perspectives introduced the detection of new gender inequalities related to career access, in the precarious condition of grade C of academic career, which might not be well-suited with working women (Picardi 2017, 2019). Within these recent Italian contributions, the question emerges of the impact of some sections of the 2010 university reform on the share of female staff in the academy and the possibilities of developing women's careers in university teaching. Some elements (temporary position of grade C careers, an extension of the phase following the achievement of the doctorate and before grade C, reduction in the absolute value of the teaching staff for the cross-application of reform and blocking of the turnover of university staff) have been adequately put highlighted by Italian literature on the subject. Some aspects, such as the reduction of career opportunities for female academic staff, after the approval of the reform, have some aspects still of being clarified, even though significant contributions have been made on the subject (Minervini, 2017; De Paola Ponzo Scoppa, 2018). In particular, it is necessary to ask what impact in terms of gender was obtained from the application of the reform, especially on sectors where the gender gap in access and career progression was not, in the past, as relevant as in the STEM.

A good case study to which to apply this metric of analysis of a reform that never refers in its text to equal gender opportunities is that of academic sociology: it is a discipline customarily suited to the analysis of the role of women in society, in economics and at work, in politics and law, in which the female voices of research and teaching have had space and relevance. This has happened not only and not so much in gender studies, but for the more complex construction of a gender perspective in research, never missing a female perspective in the analysis of social phenomena. Checking the impact of the reform on the academic top of the sociological academic profession, also detecting any deviations from the rest of the academic world, therefore appears to be a good test on the gender effects produced by the law of 2010.

2. The 2010 University reform and its impact on women in academic sociology

2.1 The general context of the 2010 University reform

The 2010 university reform brought significant changes to the recruitment and career progression for academic staff. Before the reform, the degree of access to the career (researcher, grade C) was a permanent contract; the reform sought to introduce a sort of tenure track for this level of career, making this precarious position in fact, with the creation of two fixed-term researchers (type A and

type B, diversified by the different opportunities transformation of the place from fixed-term to permanent). This precarious configuration, together with the delays in defining the competitions' requirements for these two figures, has created delays and disincentives in the academic careers of researchers, post-doc men, and women.
As far as career progressions are concerned, they have been based on a double selection mechanism. First, the permanent researcher, before the reform and the fixed-term researcher after the reform, must undergo a national evaluation of qualifications and publications to access grade B and A careers. Only after the national scientific qualification, managed by a national commission of 5 full professors with special qualification to be commissioner, is it possible for the qualified C or B grade staff to participate in local competitions for obtaining their position as assistant or full professor.
This transition had a twofold impact. On the one hand, the precarity of grade C had an impact on the Ph.D. and post-docs who had to face the transition from an idea of grade C indefinitely (as in the past) and a new model of fixed-term Grade C. It was an ideal transition from a long, precarious job (with several post-doc contracts) to an even longer precarious job. This aspect may have had a whole disincentive effect. However, this impact may have been even more significant on the share of female staff, who interrupted their path, after Ph.D. and post-doc, before reaching grade C, because they could not see stable working opportunities and often being in the condition of having to reconcile life as a couple and family with this new precarious condition.
On the other hand, the two-way path for the transition from grade C to grade B and from grade B to grade A of career - also due to the delays in the application of the primary selective mechanism - led to a postponement in career changes staff of grade C and B, with sieve effects on the careers of researcher and assistant professor, often related to gender issues. For example, often, more large teaching loads are entrusted to women researchers and associate professors. At the same time, male colleagues appear more likely to manage their scientific production, obtain roles in scientific associations and academic governance, and complete a series of scientific and relational activities, particularly useful for the academic steps to full professorship.
This trend combining longer precarity and delays in further progression (due to the 2 level path of academic progression) might have impacted the stock of female academics before and after the reform. The second part of this chapter proposes an analysis of the Italian national data on the stock of male and female academic staff before and after the reform, taking as a reference two years 2011, before the applied decrees of the reform were applied, and 2018, after two sessions of national scientific qualification, which also occurred with an adjustment of the rules relating to titles and publications. To better understand the effects on gender, I will consider general data on academic stock, as provided in a free and open form by the Ministry of the Italian University, and particular data relating to a non-STEM sector, sociology. The leading gender indicators in the professions will be applied to the general data on the overall academic stock and sociology: the rate of femininity, the Glass Ceiling Index, and the Progression Glass Ceiling Index.

2.2 The impact of University reform on the whole academic staff and the Sociology Sector: a gendered approach

According to the free online data provided by the Italian Ministry of University, the stock composition of academic staff in 2011 and 2018, before and after the reform of 2010 became effective was the following:

Tab. 1. Academic staff per level and gender in 2011 and 2018.

2011			
FEMALE	GRADE A	FULL PROFESSOR	3145
MALE	GRADE A	FULL PROFESSOR	12097
TOTAL	GRADE A	FULL PROFESSOR	**15242**
FEMALE	GRADE B	ASSISTANT PROFESSOR	5754
MALE	GRADE B	ASSISTANT PROFESSOR	10857
TOTAL	GRADE B	ASSISTANT PROFESSOR	**16611**
FEMALE	GRADE C	RESEARCHER (FIXED TERM + PERMANENT)	11794
MALE	GRADE C	RESEARCHER (FIXED TERM + PERMANENT)	14394
TOTAL	GRADE C	RESEARCHER (FIXED TERM + PERMANENT)	**26188**
TOTAL FEMALE	A+B+ C	FULL PROF + ASS. PROF.+ RESEARCHER	20693
TOTAL MALE	A+B+ C	FULL PROF + ASS. PROF.+ RESEARCHER	24388
TOTAL	A+B+ C	FULL PROF + ASS. PROF.+ RESEARCHER	**45081**
2018			
FEMALE	GRADE A	FULL PROFESSOR	3130
MALE	GRADE A	FULL PROFESSOR	10055
TOTAL	GRADE A	FULL PROFESSOR	**13185**
FEMALE	GRADE B	ASSISTANT PROFESSOR	7984
MALE	GRADE B	ASSISTANT PROFESSOR	12800
TOTAL	GRADE B	ASSISTANT PROFESSOR	**20784**
FEMALE	GRADE C	RESEARCHER (FIXED TERM + PERMANENT)	9492
MALE	GRADE C	RESEARCHER (FIXED TERM + PERMANENT)	8801
TOTAL	GRADE C	RESEARCHER (FIXED TERM + PERMANENT)	**18293**
TOTAL FEMALE	A+B+ C	FULL PROF + ASS. PROF.+ RESEARCHER	20606
TOTAL MALE	A+B+ C	FULL PROF + ASS. PROF.+ RESEARCHER	31656
TOTAL	A+B+ C	FULL PROF + ASS. PROF.+ RESEARCHER	**52262**

If we consider the usual gender indicators (the rate of femininity FR, the Glass Ceiling Index, GCI, and the Progression Glass Ceiling Index PGCI) for the professions within this reference universe in 2011 and 2018, the following results occur:

Tab. 2. Leading gender indicators on overall Italian academic staff in 2011 and 2018.

2011	**FR.**	**GCI**	**PGCI from Grade C to B**	**PGCI from Grade B to A**
GRADE C	0,81			
GRADE B	0,52	**1,75**	**2,08**	**1,85**
GRADE A	0,26			
2018				
GRADE C	1,07			**2,6**
GRADE B	0,62	**1,69**	**1,18**	
GRADE A	0,31			

The indicators relating to the rate of femininity significantly improve in access to the career segment, with women exceeding their male colleagues in the grade C career (fixed-term + permanent researchers) in 2018, while data show a progressively less significant increase in grade B (from 0,52 to 0,62 for assistant professors) and even more reduced growth in grade A (from 0,26 to 0,31 for full professors). The glass ceiling index (GCI) shows a slight improvement from 2011 to 2018 (from 1,75 to 1,69), recording a limited overall improvement in equal opportunities in academic career paths. Nevertheless, if we consider the progressive glass ceiling index (PGCI), applying it to the opportunities for career paths between grade C and Grade B and between the big B and the Grade A, in 2011 and 2018 we get a different result: the opportunities of transition from the position of a researcher to assistant professor improved significantly for women during the period of application of the reform (from 2,08 to 1,18) but worsened significantly for the female academic staff in the transition from associate professor to full professor positions (from 1,85 to 2,6). The global result of these data and indicators on the Italian academic staff suggests that in the face of a greater feminization of the sector, especially in the career access positions, resistances remain in career progression, especially at the top level, not allowing full deployment of the potential of the female academic staff. This stands as evidence confirming that, in the face of a progressive feminization of the Italian academy, structural conditions of vertical segregation and leaky pipeline resist.

2.3 The gender impact of the University reform on Sociology academic staff

According to the free online data provided by the Italian Ministry of University, the staff composition of academic sociology in 2011 and 2018, before and after the reform of 2010 became effective, was the following:

Tab. 3. Academic staff per level and gender in Sociology in 2011 and 2018.

GENERAL SOCIOLOGY	GRADE C MEN	GRADE C WOMEN	TOTAL GRADE C	GRADE B MEN	GRADE B WOMEN	TOTAL GRADE B	GRADE A MEN	GRADE A WOMEN	TOTAL GRADE A	TOTAL MEN (A+B+C)	TOTAL WOMEN (A+B+C)	TOTAL STAFF (A+B+C)
2011	119	123	242	103	49	152	104	32	136	326	204	530
2018	57	63	120	74	56	130	50	19	69	181	138	319
CULTURE AND COMMUNICATION SOCIOLOGY												
2011	69	76	145	44	31	75	43	26	69	156	133	289
2018	42	47	89	52	58	110	38	24	62	132	129	261
SOCIOLOGY LAW AND POLITICS												
2011	28	20	48	23	11	34	22	7	29	73	38	111
2018	16	15	31	24	13	37	15	5	20	55	33	88
ECONOMY + TERRITORY SOCIOLOGY												
2011	59	44	103	48	25	73	28	12	40	135	81	216
2018	26	21	47	53	37	90	26	21	47	105	79	184

Some considerations on the number of academic sociologists are self-evident: a marked contraction of the staff at all levels (grades A, B, and C) can be detected in the considered time, with a peak of -39,8% in academics teaching General Sociology. This sector staff contraction goes against the general increase in university staff, measured during the same period, as in tab. 1. At the same time, the reduction of women in the academic staff of sociology seems more contained than the loss of places for male colleagues, who, in the past, benefited from a more massive presence within the University sociologists. To better understand how gender distribution in this academic sector changed before and after the University reform, I applied the leading gender indicators (feminization rate, glass-ceiling index, and progressive glass ceiling index) to the academics that have been conventionally devoted to carrying on gender studies in Italian academia. The results of the analysis on indicators are in tab. 4:

Tab. 4. Main gender indicators (FR, GCI, PGCI in Italian Sociology sector in 2011 and 2018.

	FR	GCI	PGCI GRADE C-B	PGCI - GRADE B-A
GENERAL SOCIOLOGY				
2011	0,62	1,65	2,5	1,5
2018	0,76	1,59	1,1	3
CULTURE AND COMMUNICATION SOCIOLOGY				
2011	0,85	1,24	2,4	1,1
2018	0,97	1,28	0,8	2,4
SOCIOLOGY LAW AND POLITICS				
2011	0,52	1,41	1,8	1,5
2018	0,6	1,48	1,1	2,6
ECONOMY AND TERRITORY SOCIOLOGY				
2011	0,6	1,23	1,7	2
2018	0,75	0,95	0,5	1,7

On the ground of the analysis of the indicators in 2011 and 2018, before and after the Italian University reform, it emerges how the femininity ratio (FR) grows slightly in all four subsectors of academic sociology, improving the female presence in the sector: the femininity rate is almost equal to 1 in the subsector of Sociology of Culture and Communication. The data relating to the Glass Ceiling Index improve within two sub-sectors (General sociology and Economic and territorial sociology). In comparison, there is a slight deterioration for the other two sub-sectors (Sociology of culture and communication and Political and legal sociology): the analysis of this dataset shows a substantial lack of impact of the reform on the sector of academic sociology. The data show a more definite trend if we consider the Progressive Glass Ceiling Index. From the analysis of this indicator in academic sociology, it emerges that the opportunities for the transition from grade C to grade B have improved for women researchers in all four sub-sectors of Sociology. At the same time, the situation described by the PGCI worsens significantly in three out of four disciplinary subsectors for women assistant professors who seek to achieve the position of full professor (from grade B to grade A). This analysis demonstrates the persistence of the glass ceiling hypothesis in Italian academic sociology, mainly when we refer to full professor positions. Therefore, the impact of the reform negatively affected the number of staff included in the sociology sector, while making it possible to worsen an academic woman's opportunities to reach the top of her academic career, despite a growth in the feminization of the sector. This is a more unsatisfactory outcome than the average academic body in the same period, especially with the mention of the worsening of the PGCI from grade B to grade A in academic sociology.

3. Conclusion: the 2010 University reform impact on academic staff in Italian academia and Italian academic sociology

Any reform that does not take into account gender equality measures is bound to have an impact, generally not positive, on the female presence in the reformed sector. The reform of the Italian University of 2010, with its substantial changes in terms of recruitment and career progression and without a single mention of the gender dimension, makes no difference in this sense. Much of the mentioned literature referring to the Italian case focussed on the impact of gender distortion on the academic career produced by two of the main innovations of the University reform of 2010: the precarity of grade C of the career, after a long post-doc path, and the lengthening of time career progression, due to the double mechanism of national scientific qualification and the subsequent local competition. Analysing the data on the entire Italian academic sector, in 2011, before the implementation of the reform and subsequently, in 2018, increases in staff stocks and the overall femininity ratio emerged. However, the latter indicator remains confined to the academic entry positions but does not translate into similar feminization rates of the top positions in the academic career. In particular, while noting a slight improvement in the global career opportunities for female researchers, the gender gap in access to Grade A careers remains decided, with a worsening of the Progressive Glass Ceiling Index for women entering full professorship.

An even worse situation occurs in the sociology sector. With the persistence of the leaky pipeline for women who intend to access the top of their careers (worsening of the PGCI in 2018 in three out of four scientific subsectors of sociology), the staff stock records a significant decline in absolute values, while academic staff increased at the same time. In this scenario, lower permanent academic positions are reserved for a smaller number of female sociologists who aspire to the top of their careers. This situation, which arose after the impact of the university reform, is certainly not the most likely situation to attract new academic staff with fresh thinking and looking for ambitious professional opportunities.

This double contraction in numbers and access for women to top positions in academic sociology represents a real problem for the discipline. It is not just a matter of supporting gender studies, traditionally allocated within this disciplinary sector and entrusted, according to custom, to women

sociologists. It is a question of supporting the diversity of points of view and perspectives within the sector, guaranteeing adequate representation for women who intend to study economic, legal, political, and cultural sociology, according to a specific perspective, which also considers women. From the management of differences in academic groups, research and teaching, fruitful moments of comparison, exchange and improvement for the discipline always emerge, as Desivilya et al. (2017) noted. Considering the impact of the reform on the stock of staff of the academy in general and in the sector of sociology in particular; drawing a summary of trends and differences; evaluating corrections and turnarounds from the occurring trends are the first steps in understanding the direction Italian sociology intends to pursue, in order to recover that plurality of voices, perspectives and points of view emerging from a correct management of diversity, in particular gender diversity, in the construction of research and in-depth studies. Only by achieving this pluralism of female and male academic perspective in academic life, it will be possible to pursue the aim of the sociology**:** to infuse a new kind of attitude into social life, enriching groups and individual perspectives with diversity of perspectives.

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Is it just a memory from the past? An analysis of the gender productivity gap of Italian academics in 2015-2016

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Abstract
This chapter investigates the gender productivity gap in Italian universities, in order to provide a picture of women's disadvantages in academic career advancement before the Covid-19 pandemic crisis. Survey data from a national study on Italian academics carried out between the end of 2015 and the beginning of 2016 were used. The data allowed us to observe the relationship between gender and scientific productivity in a large representative sample of academics (N=5.123) from all disciplinary fields, providing insight on the production of two types of scientific publications: monographies (1), and journal articles and chapters in edited volumes (2). Moreover, the data allowed us to examine the gender productivity gap focusing on the generational issue, assuming that this gap narrows among younger researchers, as various scholars in other national contexts underlined.
Results show that the gender productivity gap persists in the Italian Academia, albeit with specific differences in the type of scientific product and the disciplinary field: it is significant in SSH for both books (1) and articles and chapters (2), but the gap concerns only the second type of publication (2) in STEM. Moreover, in STEM disciplines younger women and men are equally productive, whereas in SSH younger women continue to publish fewer articles than younger men. Different explanatory hypotheses from the literature are proposed for these results, taking into account gender bias and the neoliberal turn in the academic organisational culture.

1. Introduction

Over the last years, the debate on gender inequality in the university environment has been investigated by numerous studies in different contexts. Despite the steady growth in the number of women in tertiary education and PhDs, there is a persistence of gender imbalance in the academic sector. The latest European report on the situation of women in academia (European Commission 2019) shows that, in 2016, women made up 40% of associate professors and only 24% of full professors, highlighting a wider gap in Science, Technology, Engineering and Mathematics - STEM. Furthermore, according to the same report, women were under-represented in scientific articles authorship. In Italy, the most recent MIUR analyses (2020) follow the same direction.
The scarce presence of women in managerial positions and leadership roles, known as vertical segregation or *glass ceiling*, has been investigated in numerous studies (Pyke, 2013; Solera and Musumeci, 2017; Roberto, Rey, Maglio, Agliata, 2020), as well as horizontal segregation in specific disciplinary areas, in particular Social Sciences and Humanities - SSH (Sattari and Sandefur, 2019): the more stable the position, the larger the gap. Several studies have focused on the issue of access to permanent positions and on the path from early career stages to professorship. Analyses of the phenomenon of the *leaky pipeline* (Monroe and Chiu, 2010) and entrapment in the labyrinth (Picardi, 2020) indicate that, more often, women remain in precarious conditions, to be then expelled from the academic sector (Murgia and Poggio, 2018).
This chapter will examine the gender productivity gap with a focus on the generational issue. After introducing the determinants of the gender gap in scientific productivity and the changes in the Italian academic system, occurred over the last decades and exacerbated in the last years by the establishment of the *publish or perish* culture, we will show how the data collected in 2015-2016 could provide some valuable evidence on these themes, even more important today.

2. Neoliberal Academia and the Determinants of the Gender Gap in Scientific Productivity

In recent decades, relevant transformations have taken place in the academic organisational culture. A neoliberal organisational culture model, rooted in public universities as well as in other domains of society, appears to be hegemon on the international scene. The framework of the so-called *New Public Management* - which has institutionalised temporary contracts and is based on the centrality of the performance - identified competitiveness as a principle and the pressure to publish as the norm (Thomas and Davies, 2002; Poggio, 2018; De Coster and Zanoni, 2019; Ivancheva, Lynch and Keating, 2019).

Numerous studies have highlighted how the pillar of this model, the concept of *excellence*, has deep consequences on work-life balance and life planning, especially for women and above all for mothers (Probert, 2005; Rafnsdóttir and Heijstra, 2013; see also the special issue edited by Dubois-Shaik and Fusulier, 2017). This neoliberal organisational framework affects academic scientific productivity and needs to be investigated in a gender perspective (Stack, 2004; Fox, 2005; Mairesse, Pezzoni and Visentin, 2019).

The conceptualisation of *excellence* as neutral and quantifiable (Rees, 2011; Van den Brink and Benschop, 2012) is defined not only nor primarily by the evaluation of the quality of the research, but mostly by the quantification of published products, namely productivity, and the measurement of citations through bibliometric indicators. As the next paragraphs will explain, the procedures for quantifying productivity are now consolidated practices in Italy, in the form of processes to achieve the National Scientific Qualification and measurements on the basis of the Evaluation of the Quality of the Research. The number of research products, even before qualitative assessment, is what determines whether or not an author can access the path for obtaining the NSQ, the first step towards being able to apply for permanent positions. Therefore, dimensions strongly affected by gender imbalance such as evaluation, recruitment and career advancement, are also directly conditioned by the number of publications, the quantification of products. Undoubtedly, an analysis of productivity from a gender perspective is therefore relevant (Aiston and Jung, 2015).

Research productivity, assessed through bibliometric indicators to quantify the quantity and quality of research output, plays a crucial role towards gaining success in the NSQ. This system reinforces the *publish or perish* academic culture: if researchers do not publish enough, they are destined to perish - and often those who perish are women (Weisshaar, 2017), pressured out like droplets in a *leaky pipeline* (Monroe and Chiu, 2010; Filandri and Pasqua, 2019), especially in STEM area (Sattari, Sandefur, 2019).

Numerous studies underline that the gender productivity gap is present in many contexts, but most of these studies, especially in Italy, show empirical evidence taken either in very specific disciplinary sectors and contexts (D'Amico, Vermigli, Canetto, 2011; Akbaritabar, Casnici adn Squazzoni, 2018) or in sectors in which researchers are evaluated by bibliometric indicators (Abramo, D'Angelo and Caprasecca, 2009; Madison, and Fahlman, 2020). In the latter, the evaluation is based on the measurement of citations, using databases that do not allow to study this gap by keeping control over many of the factors that could influence it.

International literature shows a systematic relationship between scientific productivity and gender: women publish less than men, especially in high-impact journals, and are less cited (Stack, 2004; Fox, 2005; Abramo, D'Angelo and Caprasecca, 2009; Hunter and Leahey, 2010; Aiston and Jung, 2015; Abramo, D'Angelo and Di Costa, 2018). The few studies that do not highlight significant gender differences have been conducted on small populations with very specific characteristics (Mayer and Rathman, 2018).

To explain the differences in productivity between individuals, some hypotheses have been formulated in the scientific literature, taking into consideration various factors: personal, cultural and organisational or contextual.

On the one hand, some of the factors considered in the scientific debate were the role of gender bias, distortion, assessment errors in decision-making processes, often unconscious, connected to gender stereotypes and prejudices (Helmer et al., 2017).
On the other hand, the literature shows how gender bias also influences decision-making processes for women themselves, who tend to propose fewer articles than men, especially to prestigious journals, and to apply less frequently than their male colleagues for high-ranking positions (Bosak and Sczesny, 2008; De Paola, Ponzo and Scoppa, 2017; 2018), instead dedicating more time to tasks that do not influence their career, such as service work (Guarino and Borden, 2017; Lynch et al., 2020).
Furthermore, the *homophily hypothesis* (Murray et al., 2019) notes how the frequently male-dominated composition of editorial committees and evaluation commissions (Addis and Villa, 2003) tends to penalise women, due to the unconscious preference for people of the same gender in the evaluation process (De Paola and Scoppa, 2015).
Many studies have emphasised that the organisational context and the professional environment are also crucial for scientific productivity. Networking in particular increases the chances of publishing (Lee and Bozeman, 2005), and several surveys have shown that men more often join, or lead, research groups (Van den Brink and Benschop, 2014).
Some of the gender policies implemented by universities to frame imbalance as well as to create networks among academic women are worth mentioning, from the Gender Budgeting to Gender Equality Plans and Gender Action Plans (Bozzon, Murgia and Poggio, 2016), to the different gender practices in *networking* and *mentoring* (Poggio, 2016; Picardi and Agodi, 2020).
Finally, it is very interesting to note that some analyses show that the gender productivity gap appears to narrow for younger generations (Van Arensbergen, Van der Weijden and Van den Besselaar, 2012), even if it is a matter of fact that the phenomenon persists over time (Van den Besselaar and Sandstrom, 2016). This change in the new generations of academics is contemporary with the last period of the neoliberal turn and could be linked with the expansion of this organisational culture. The *publish or perish* principle influences the scientific productivity gap: female academics, just like their male colleagues, are pressured into publishing, today more than ever.

3. The Productivity of Italian Academics: Squeezed Between Scarce Resources and High Pressure to Publish

In Italy, the allocation of funding is intertwined with scientific productivity - and influences a range of inequality determinants. Established in 2004, the Evaluation of the Quality of Research system assesses universities and researchers' quality of research mainly through peer evaluation. The results are used for the allocation of the Ordinary Financing Funding reward shares. Therefore, the productivity of every researcher and professor contributes towards the university receiving funding, creating a vitious circle in which universities located in more affluent areas are often allocated greater funding than others.
What is more important, this increases the North-South divide. RES Foundation's 2015 Report underlined that the distribution of ordinary public funding widened the gap between the universities of the North and the universities of the Centre-South: the latter have lost 12%, with peaks of over 20% in the Islands, against a 4,3% loss for universities in the North (RES Foundation 2015).
In the Italian academic system, recruitment procedures, employment conditions and salaries in public universities are instituted by national laws and reforms. The salaries of permanent academic staff only vary according to their level and seniority. Each professor specialises in a research field: the National University Council defined 383 disciplinary-scientific sectors, regrouped into 14 areas. Any job vacancy is associated with one of these sectors, and applicants are evaluated by a commission of professors working in the same field.

Researchers and professors can only be hired through public tenders, which should guarantee a) public advertisement of the vacancy, b) objectivity in the selection criteria (and in the selection of the selective committee), and c) transparency in the selection process. Accountability should theoretically guarantee total fairness in this process, but more often than not proves to be a *veil of Maya* that covers the reality of a neoliberal governance, in which inequalities are still present because of the persistence of a (white, middle-aged) "masculine professional norm", which women (or other categories) fail to actually fully adhere to (De Coster and Zanoni, 2019).
From the point of view of the allocation of resources, it is due noting that the Italian university system has suffered significant funding and personnel cuts in the last decades, especially academic staff. Italy recorded a -14,4% funding decrease in real terms for tertiary education from 2008 to 2018, a figure higher than both the economic decline and the decline in student numbers. The European University Association's Public Funding Observatory Report of 2019-20 underlines that, in the period 2008-2018, the cuts implemented were not compensated by the overall investments, and the funding has stabilised at a very low level (European University Association 2020).
The funding cuts caused a significant contraction in the number of both tenured and fixed-term positions, from academic year 2007-2008 to 2017-2018 the report shows a decrease of -17% in academic staff and -26% in non-academic staff, in the face of a decrease of only -8,5% in university students. In absolute numbers, the decrease equals 21.643 units, from 130.481 to 108.838 people employed as academic staff in Italian public universities (European University Association 2020). In addition to this, it is to be highlighted that the Italian public investments in Research and Development are also modest.
Furthermore, since the Gelmini Reform in 2010 (L. 240/2010), the recruitment process has been organised through the National Scientific Qualification, a necessary requirement for accessing associate and full professorships, therefore making it mandatory for researchers to gain this qualification to apply for permanent positions. As a matter of fact, this Reform stressed the importance of the quantity of publications already in the early career stages.
Each round of the NSQ procedure uses medians to calculate the average quantity of publications produced by all the Italian academics working in the same field. To gain a tenured position in an Italian university, researchers need to publish a minimum quantity of papers, essays and monographs to reach these medians and obtain the qualification; then they can apply for a public tender for a permanent position.
Today, the *publish or perish* principle is a fact: the pressure to publish is strong, and the quantity of products, especially journal articles, determines the work of academics and university funding (Van Dalen, 2021). This pressure affects academics' productivity, increasing the number of publications (but what about the quality of the research?) and getting academics to start discussing the issue, especially in the STEM area (Génova and De la Vara, 2019). In an academic system characterised by funding cuts, such as the Italian one, the competitiveness and pressure are at all-time highs.

4. An Analysis of the Gender Productivity Gap in the Italian Academia

In this paragraph, we want to give an empirical picture of the relationship between gender and scientific productivity in Italy starting from the hypothesis, maintained by the literature just examined, that a productivity gender gap exists, and women publish on average less than men, even net of some of those factors that research shows to be important determinants of productivity. In addition to this research aim, we are questioning another aspect that some recent contributions have highlighted (Van Arensbergen, Van der Weijden and Van den Besselaar, 2012): we wonder whether the gender productivity gap is more limited in younger generations of scholars than in older ones.

To answer our questions, we used data from a sample survey of 5.123 Italian academics working in all the Italian public universities, carried out between the end of 2015 and the beginning of 2016[3]. These data prove extremely useful since, in addition to being collected on a national and statistically representative sample of academics from all disciplines, it allowed us to look at scientific productivity on at least two types of publications, which constitute the two products of *excellence* in the two macro areas, STEM and SSH.

Respondents were asked to indicate the number of contributions (articles or essays) in scientific journals or volumes and the number of monographs they published in the last five years. In this way, the two cardinal scientific productivity variables worked as our two dependent variables. The only correction made to these variables in the post-detection phase was the re-coding of missing value to zero, in case there was at least one of the answers to the questions about scientific products. In the case of missing answers to all questions, the cases were excluded from the analysis. The responses of academics who appeared to be outliers were not deleted. Using different identifying methods for outliers[4], we analysed their consistency, distribution, and possible determinants. In particular, the fact that the group of academics identified as outliers had on average almost twice as many research collaborators as the others, has seriously questioned the hypothesis that the number of publications declared was incorrect, since it means that they are academics who can count on important resources, both human and financial, elements that assume and favour high productivity at the same time. With this in mind, we therefore preferred to include the variable of the number of collaborators among the control ones and follow a conservative approach of the respondents' statement. In addition to the number of collaborators in the five years prior to the interview (sum of the number of PhD students and research fellows), the other control variables that we included in the multivariate models, to control the relationship between scientific productivity and gender, were: age in years; academic position (full professor, associate professor, researcher); disciplinary area (as considered at sampling stage); geographical area where the university is located (as considered at the sampling stage); the size of the university, classified on the basis of the number of students enrolled (small, up to 10.000 students; medium, 10.001 to 20.000 students; large, 20.001 to 40.000 students; mega, with more than 40.000 students).

Among the respondents, men were 56,4% and women were 39,4%; we excluded those who did not indicate sex (4,2%)[5] from the analysis. In the whole academic population, without distinction of role, disciplinary area or age, women's scientific productivity is lower than men’s in terms of the average number of monographs and, more markedly, the average number of articles and essays[6]. In the five years prior to the interview, men published on average 1,4 monographs and 23,3 essays or articles, whereas women respectively on average 1,2 and 17.

The average level of scientific productivity varies according to different career stages, so those in a higher position have published more than those in an intermediate or initial stage, and, since women in high positions are fewer than men, gender differences are to be considered within each stage. The productivity gap between men and women remains in all academic positions only with regard to the

[3] Data come from the survey on third mission activities of Italian academics carried out as part of the PRIN 2011 Project "University, Innovation and Economies Regional". The sample was randomly extracted from the list of names of professors and researchers in the role as of 31 December 2013 provided by the MIUR and was stratified according to two criteria: the disciplinary area of teaching and the geographical location of the university of reference. The disciplinary area has been aggregated into 7 distinct categories on the basis of the scientific-disciplinary sectors: Humanities and the Arts; Engineering and Architecture; Social and Behavioral Sciences; Business, Economics and Law; Mathematics, Physics and Natural Sciences; Agricultural and Veterinary Sciences; Health Sciences. The geographical area of location of the university of reference has been classified in 5 macro-regions on the basis of ISTAT: North West, North East, Centre, South, and Islands. The distribution of the actual sample (response rate of 34,2%) was proportional to the reference population not only for the two stratification variables, but also for other relevant characteristics, such as gender and academic role.

[4] Specifically, we have used the method of *Range* added interquartile of the value +3 and the method of standardized values (with threshold value +3 to identify those excess extremes); in both cases we operated within the 14 CUN areas.

[5] Although not stratified by gender, the actual sample was distributed proportionally by gender to the population of researchers and professors in service in 2015 (MIUR data) both at the overall level and within the role and within the disciplinary areas.

[6] For reasons of space and not to burden reading of the chapter, the calculations relating to the total sample - both bivariate, both multivariate – are not included in the text; are available on request to authors.

productivity measured by the number of articles or essays, while with regard to monographs, gender differences remain only in early career stages (tab. 1). Moreover, when it comes to monographs, women appear on average less productive than men only in the macro-area of SSH, where this kind of product is more relevant towards one's career, while in the STEM area the differences do not appear great enough to be significant. In both macro-subject areas, however, women report significantly fewer articles and essays (tab. 2).

Tab. 1. Analysis of variance of scientific productivity by gender within academic roles.

		Men	*Women*	*Total*		
		Average (Std. Dev.)	*Average (Std. Dev.)*	*Average (Std. Dev.)*	*F-test*	*Sig.*
Researcher	Monographs	1,3 (3,3)	1,1 (2)	1,2 (2,7)	5,045	,025
	Articles or essays	20,2 (36,2)	15 (23,7)	17,4 (30,2)	14,361	<,001
Associate Professor	Monographs	1,3 (2,5)	1,3 (2,3)	1,3 (2,4)	0,088	,767
	Articles or essays	22,9 (30.7)	18,5 (18,6)	21,1 (26,5)	13,567	<,001
Full Professor	Monographs	1.5 (2.6)	1,4 (2)	1,5 (2,4)	0,596	,440
	Articles or essays	27,2 (37,6)	21,2 (28,6)	25,3 (35,1)	7,532	,006

Tab. 2. Analysis of variance of scientific productivity by gender within the two macro-disciplinary areas.

		Men	*Women*	*Total*		
		Average (Std. Dev.)	*Average (Std. Dev.)*	*Average (Std. Dev.)*	*F-test*	*Sig.*
SSH	Monographs	1,7 (2,5)	1,5 (1,9)	1,6 (2,2)	5,165	,023
	Articles or essays	15,3 (14)	12,5 (9,8)	13,9 (12,1)	23,702	<,001
STEM	Monographs	1,2 (2,9)	1,1 (2,3)	1,2 (2,7)	3,001	,083
	Articles or essays	26,6 (39,5)	20,5 (28,1)	24,2 (35,5)	23,608	<,001

Tab.3. Analysis of variance of scientific productivity by gender within the two age groups.

		Men	*Women*	*Total*		
		Average (Std. Dev.)	*Average (Std. Dev.)*	*Average (Std. Dev.)*	*F-test*	*Sig.*
Up to 45	Monographs	1,5 (3,5)	1,3 (2,4)	1,4 (3,1)	1,925	,166
	Articles or essays	22,8 (30,7)	18,5 (29,4)	20,9 (30,2)	7,331	,007
Over 45	Monographs	1,3 (2,4)	1,2 (2,1)	1,3 (2,3)	2,175	,140
	Articles or essays	23,5 (35,8)	16,8 (19,7)	20,6 (30,2)	43,627	<,001

Finally, we observed the gender productivity gap within two age groups – up to 45 years of age and over 45 years of age – to test the generational hypothesis. The choice to divide the sample into these two age groups was mainly determined by methodological reasons. On the one hand, the need to have an adequate number of cases for each category of each variable included in subsequent multivariate models, required limiting the segmentation of the sample, since a small number of women could affect the significance of the relationship. On the other hand, the literature shows that if there is a decrease in the productivity gap, this concerns the younger generations. So, there was no reason to hypothesise that further division into several age groups could be useful.

tab. 3 shows scientific productivity for men and women within the two age groups. On the one hand, the analysis of variance reveals that the gap in the average number of monographs is not significantly different between men and women in either generation. On the other hand, the gap in journal articles persists even among younger scholars, though narrowing comparing to that of over-45s, due to a higher average number of articles and essays published by young women and a lower number published by young men.

As already shown in these preliminary analyses, the association between gender, productivity and other explanatory factors is evident. In fact, our independent variable, gender, is not equally distributed within the subject areas and academic positions and, overall, when taking into account the whole sample, women are on average younger than men (with an average age of 50,6 years, as against an average age of 52,1 years for men), and moreover they can count on fewer research collaborators (on average 1,4 as against 1,7) that, as mentioned above, constitutes a factor significantly associated with higher scientific productivity.

In order to consider the complexity of all the factors, it is therefore necessary to use multivariate models to estimate the average differences in productivity between men and women, while taking into account all the other potentially influential available elements.

The two negative binomial regression models (one for each productivity indicator, monographs and articles) show that, when all control variables are considered (in particular the academic role, the disciplinary area and the number of research collaborators), the differences between male and female productivities are reduced: they become non-significant as far as monographs are concerned, and greatly decrease for articles and essays (the estimated marginal difference decreases from +6,3 to +3,6)[7].

Our initial hypothesis therefore finds a first feedback, which reveals the existence of a gender productivity gap in the Italian academia in favour of men. However, this gap does not seem to be significantly wide on all product types: women and men, for the same age, academic position, disciplinary area, number of collaborators and contextual characteristics, publish on average a similar number of monographs. The gap exists for articles and essays, although the factors considered relevant have been kept under control. These are the products on which the literature on gender inequalities in scientific productivity has mostly focused. Several hypotheses have been put forward to explain this gap.

One of the most interesting for this dimension of productivity is the one that calls into question *gender biases* and prejudices, often unconscious, that condition, with different mechanisms, both men and women and the decision-making processes they are involved in. On the one hand, these biases make women less likely to send proposals for contributions to scientific journals (Helmer et al., 2017); on the other hand, together with the phenomenon of *homophily* (Murray et al., 2019), these biases penalise women in the *peer review* and selection processes because the editorial committees are often composed by male professors (Addis and Villa, 2003).

To answer the second research question on the evolution of the gender productivity gap in generational terms, we used the same repeated model for the two types of scientific product, within the two age groups and into the two disciplinary macro-areas, STEM and SSH. In tab. 3 we have observed how the gender gap appears to be reduced in new generations of scholars because of processes having taken place in recent years which led to the affirmation of the *New Public Management* also in the Italian academia.

The establishment of this neoliberal organisational culture and of the *publish or perish* principle, together with, perhaps, a greater presence of women in academia, seems to limit the action of unconscious gender biases and homophily that are mentioned in the scientific literature among the main determinants of the gender productivity gap. Dividing the analysis by macro-area also has the advantage of showing whether the assumed minor gender productivity gap of new generations of academics is similar in STEM and SSH, or whether the generational change affects one disciplinary area more than the other.[8]

[7] In the model conducted on the entire sample, we inserted among the control variables the disciplinary area recoded in 7 categories. In subsequent analyses, we used the macro area of STEM disciplines and the macro area SSH disciplines to differentiate the models; the others control variables are the same as the other models: age, position, number of collaborators, geographical area and size of the university of reference.

[8] In models, although conducted separately for macro-areas, disciplinary areas that refer to the macro reference area have been included as control variables. This analysis strategy has made it possible to minimise the effect of outliers on normality assumption of the residuals required by the model used.

The results of the multivariate analysis show that the gender productivity gap in SSH (tab. 4) is significant for over-45s both in terms of monographs and articles and essays published in scientific journals and volumes, while for the group of younger academics the gap concerns only the latter dimension of productivity. Other factors being equal, young women publish the same number of monographs, but fewer articles than young men. Indeed, the gender gap related to articles seems to be greater among younger academics than among over-45s.

Tab. 4. Negative binomial regression models on scientific productivity in SSH disciplines for two age groups (Coefficients)

	Monographs		Articles and essays	
	Over 45	Up to 45	Over 45	Up to 45
Intercept	0,66	2,805***	3,763***	3,693***
Men	0,212**	0,036	0,184***	0,193**
Women (Ref.)	0	0	0	0
Assistant Professor	-0,216	-0,648*	-0,508***	-0,401*
Associate Professor	-0,045	-0,49	-0,271***	-0,195
Full Professor (Ref.)	0	0	0	0
Business, Economics and Law	-0,177	-0,272*	-0,184**	-0,075
Humanities and Arts	-0,257**	-0,386**	0,087	-0,011
Social and Behavioural Sciences (Ref.)	0	0	0	0
University location: North	0,066	-0,17	0,145**	-0,104
University location: Centre	0,218*	0,077	0,173**	-0,067
University location: South and Islands (Ref.)	0	0	0	0
University size: Small	0,014	-0,434*	-0,066	-0,143
University size: Medium	-0,062	0,019	-0,051	-0,016
University size: Large	0,025	0,087	0,064	-0,007
University size: Mega (Ref.)	0	0	0	0
Age (years)	-0,004	-0,039*	-0,023***	-0,019
N. collaborators	0,017*	0,025*	0,04***	0,034***
(Negative Binomial)	0,713	0,515	0,45	0,344
Women-Men (Marginal differences)	-0,34**	-0,062	-2,221***	-3,094***
Sig.	<,001	<,001	,000	<,001
N	1094	532	1094	532

**p-value<0,05 **p-value<0,01 ***p-value<0,001*

Looking at the STEM area, we can observe a different dynamic (tab. 5). The scientific productivity measured by the number of monographs does not differ between men and women in the younger group, nor does in the older one. On the contrary, the gender productivity gap regarding the number of articles is significant among older academics, even with other factors being equal, and disappears completely among scholars up to 45 years of age. The neoliberal culture linked with the publish or perish principle seems to be more pressing in the STEM area than in SSH, especially regarding scientific productivity in journal articles (Génova and De la Vara, 2019). This could be the determinant of an increase in the scientific productivity of younger women, even leading to a closure of the gender productivity gap for the younger in the STEM area, and for journal articles specifically, as the study results show.

Tab. 5. Negative binomial regression models on scientific productivity in STEM disciplines for two age groups (Coefficients)

	Monographs		Articles and essays	
	Over 45	Up to 45	Over 45	Up to 45
Intercept	0,646	3,508**	4,775***	5,837***
Men	-0,006	0,27	0,261***	0,088
Women (Ref.)	0b	0b	0b	0b
Assistant Professor	-0,255*	-0,371	-0,638***	-0,72**
Associate Professor	-0,142	-0,266	-0,281***	-0,458
Full Professor (Ref.)	0b	0b	0b	0b
Mathematics, Physical and Life sciences	-0,333**	-0,577**	-0,055	0,172
Architecture and Engineering	0,142	-0,303	-0,273***	-0,055
Agriculture and Veterinary	-0,028	-0,09	-0,283***	-0,046
Health (Ref.)	0b	0b	0b	0b
University location: North	-0,078	-0,313*	0,113*	-0,13*
University location: Centre	-0,223*	-0,198	0,11*	-0,11
University location: South and Islands (Ref.)	0b	0b	0b	0b
University size: Small	-0,221	0,073	-0,325***	-0,254*
University size: Medium	-0,269**	-0,25	-0,218***	0,119
University size: Large	-0,581***	-0,285	-0,167***	-0,048
University size: Mega (Ref.)	0b	0b	0b	0b
Age (years)	-0,004	-0,067**	-0,027***	-0,052***
N. collaborators	0,026***	0,049***	0,021***	0,019**
(Negative Binomial)	1,65	2,56	0,715	0,61
Women-Men (Marginal differences)	0,006	-0,401	-4,961***	-2,491
Sig.	,000	<,001	,000	<,001
N	2290	914	2290	914

**p-value<0,05 **p-value<0,01 ***p-value<0,001*

5. Conclusive Remarks and Future Challenges

This essay investigates the gender gap in scientific productivity in Italy, in order to provide a picture of the disadvantage women face in academic career advancement, already present before the Covid-19 pandemic.

The data used come from a national sample survey conducted in 2015-2016 which makes it possible to observe the relationship between gender and productivity on a large representative sample of academic staff from all subject areas and on different types of publications: monographs, essays and articles.

The results show that women have, on average, a lower scientific productivity in journal articles and essays, even when considering personal, academic and contextual characteristics. The gap is articulated differently in macro areas: the gender productivity gap tends to be greater in the SSH areas

than that existing in the STEM disciplines. The main determining factors highlighted in this essay and previously underlined in the literature are gender bias, prejudices and gender stereotypes, even unconscious ones, often internalised by women themselves, which affect decisions and choices made by all social actors, also in academia. Moreover, the homophily hypothesis is taken into account.
Furthermore, we analysed two age groups of academics: up to-45s and over-45s, in order to observe if the gender productivity gap would have been smaller in the younger group, as some recent studies indicate. The results show that, comparing the two age groups' performances, the gender productivity gap among academics of a young age actually seems to have been bridged in the STEM area, perhaps due to the publish or perish principle being extremely pressing in this field (Génova and De la Vara, 2019). On the contrary, in the SSH area the gap is still significant for up to-45s, and even increases when it comes to publishing articles and essays.
Nevertheless, the persistence of profound gender inequalities in promotions and career advancements in the STEM area remains evidence underlined in the scientific literature (Sattari and Sandefur, 2019). Actually, in the academic sector, the few women who are successful in building a career are those who reach the male standards of the absolutely and inherently gendered social construct of academic *excellence* (Rees, 2011; Van den Brink and Benschop, 2012).
However, this study presents limitations. In fact, even if the data used allows for the study of the phenomenon on the entire Italian academic body and with different productivity measures, it does not takes into account important control variables, such as presence of children, use of parental leave and others of a more aptitudinal nature, which could be allowed to test hypotheses and propose more robust interpretations.
Despite these limitations, the evidence obtained is of particular relevance, since it provides an articulated picture of the gender imbalance on the measurable productivity dimension, a key factor for recruitment and advancement in the academic career today. These results are even more relevant if we consider that they offer empirical evidence on the pre-pandemic situation and will therefore be useful, in the future, in order to understand the possible effects of the current situation, still to be observed and analysed.
Reconciliation difficulties for workers of this sector seem to have worsened following the Covid-19 pandemic. The closure of schools and childcare services, together with the widespread implementation of remote working (Carreri and Dordoni, 2020), have decreased their productivity (Minello, Martucci and Manzo, 2020). Therefore, we deem it even more important today to be able to have a precise picture of the existing disparities, also with a view to trying to reduce the imbalances by implementing gendered practices and policies (Poggio, 2016; Picardi and Agodi, 2020).
Having scientific evidence of the gender disparity in scientific productivity that already existed then is even more relevant today following the health crisis, the restriction of mobility and the closure of schools caused by the pandemic. In fact, thanks to the results of this analysis, it will be possible in future research to compare the situation of 2015-2016 with the post-pandemic one.

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Dealing with Resistances along the Development of a Brand-New Gender Equality Plan: The Case of the University of Cagliari[9]

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Abstract

The essay aims to describe and discuss the process that led the University of Cagliari, thanks to its participation in the European project Horizon 2020 "SUPERA (Supporting the Promotion of Gender Equality in Research and Academia)", to invest increasingly in gender inclusiveness, defining one of the first national Gender Equality Plans.

This process has been also a great occasion for collecting main types of resistance with respect to the issue of improving gender equality within the organization, focusing on some specific key-contents: gender biases in recruitment, retention, career progression; leadership and decision making, accountability, transparency, inclusiveness; gender dimension in research and knowledge transfer, in content and curricula; gender biases and stereotypes, sexism and sexual harassment.

On the other hand, it would be "suspicious" that a structural change of this magnitude did not generate any friction, while being able to count on the institutional support assured by the University's governing bodies, starting from the endorsement expressed by both the former and the current Rector.

Moreover, this has not been a top-down, but rather a participative process. Since the very first design phase, up to the official approval of the GEP in June 2020, all the stakeholders at the various levels of the organization have been involved: from the top positions of the administrative structure, up to the teaching and research bodies, technical staff, and the wide audience of students attending the various faculties and degree courses. By this way, UniCa wants to act as a strategic actor for promoting the European founding principle of inclusivity, in its dual role: as an educational environment where to be socialized to fight inequalities and to apply the principles of an equal citizenship; as a workplace where diversity can result into risk of inequalities in the distribution of positions and in the career progression.

The Origins of the Process: the H2020 SUPERA Project (2018-2022)

The University of Cagliari (hereafter UniCA), which turned 400 in 2020, is a public state medium-size university with about 25.000 students and over 1.900 teaching and technical administrative staff. It is located in the island of Sardinia, in the middle of the Mediterranean Sea, and thanks to its geographic position, it has consolidated relationships and exchanges with the Southern Mediterranean countries, at both students and staff levels. It's a multidisciplinary higher education institution which includes 6 Faculties (Biology and Pharmacy; Engineering and Architecture; Medicine and Surgery; Sciences; Economics, Law and Political Sciences; Humanities) and 15 Departments. It has been the first Italian university to implement the European Qualification Passport for Refugees (EQPR), under the promotion of European Council and starting from the last year it's member of EDUC - European Digital Univer–city, with the aim to increase the international competitiveness of European higher education through a shared, integrated, long-term joint strategy for education with links to research and innovation, and to society.

Since June 2018, UniCA is one of the partners of an international network involved in a four–year–project funded within the frame of the European Union's Horizon 2020 research and innovation program, under grant agreement n°787829, called SUPERA (Supporting the Promotion of Equality

[9] The materials underlying this paper are the result of the collective work of the core-team of SUPERA project, composed by the scientific coordinator Luigi Raffo, and by Silvia Balia, Barbara Barbieri, Cristina Cabras, Paola Carboni, Clementina Casula, Ester Cois, Silvia De Simone, Paola Fadda, Alessandro Lovari, Francesco Mola, Giovanni Sulis, with the assistance of Manuela Aru, Giorgia Cadeddu, Michela Cordeddu, Simona Scalas, Erika Sois.

in Research and Academia). This project involves eight partners, and specifically other 3 universities (Universidad Complutense in Madrid, Spain; CES, Centro de Estudos Sociais in Coimbra, Portugal; CEU, Central European University, Hungary – then Austria), the coordination of the consultancy company Yellow Window (Belgium) and the management support of an expert from Sciences Po (Fondation Nationale de Sciences Politiques, France), and two Research Funding Organizations (the Autonomous Region of Sardinia and the Ministry of Economy, Industry and Competitiveness-MINECO, in Spain).
This project was aimed at involving UniCA as a whole, just like the other international partners, in the design and implementation of its first Gender Equality Plan, as a completely new organizational tool for dealing with gender inequalities in all areas of research, education, and vocational training at the university, and, at the same time, as a participatory planning tool focused on the involvement of all the populations who share the university place on a daily basis (teaching and research staff, technical-administrative staff, students) in promoting gender equality.
On June 29th, 2020, after an intense process of collective design in the framework of the SUPERA project, which had been going on for over two years, the Academic Senate and the Board of UniCA approved the Gender Equality Plan. But this is only the beginning of the story.
Indeed, the GEP design has not been a top-down process, but rather a participative one, since from the very first phase all the stakeholders at the various levels of the organization have been called into question: from the top positions of the administrative structure, up to the teaching and research bodies, technical staff, and the wide audience of students attending the various faculties and degree courses. The same "widespread" approach aimed at creating awareness on the relevance of the issue of gender equality and ownership with respect to the effectiveness of the tool for the organizational well-being of anyone working or studying at university, also represents the main feature of GEP's implementation, which in these first difficult months marked by the pandemic emergency from Covid-19 has started its first steps.
Moreover, this effort corresponds to the mission of UniCA itself, that, through the adoption of the GEP wants to act as a strategic actor for promoting the European founding principle of inclusivity, in its dual role: as an educational environment where to be socialized to fight inequalities and to apply the principles of an equal citizenship; as a workplace characterized by various diversities that can result into risk of inequalities in the distribution of positions and in the career progression.

The GEP as an opportunity to develop awareness on gender inequalities: a taxonomy of resistances

It would be "suspicious" that a structural change of this magnitude did not generate friction and resistance, especially in its first circulation phase. Every kind of interaction with the different categories of workers and users at UniCA has been an opportunity to collect many forms of resistance with respect to the issue of improving gender equality within the organization. Nevertheless, in general their frequency and tenor have been limited, above all do to the institutional support formally offered by the University's governing bodies, starting from the endorsement and legitimation expressed by both the former and the current Rector in all the phases of the work carried on by the core-team engaged in the SUPERA Project, since the event of its first launch, which was disseminated through the official channels of UniCA.
It is therefore necessary, when discussing resistances, to distinguish between the institutional level and the individual and occasional level: while in the first case there have been no explicit or implicit obstacles to the efficient development of the process aimed at the GEP, revealing a good organizational culture on this matter, a wide set of resistances has been instead expressed at the level of the single individuals involved in various ways in these early stages of the project.
Specifically, there have been three main circumstances when a sort of resistance has been highlighted, corresponding to three different methods used to collect the data for the purpose of defining a baseline assessment of the state-of-the-art about gender equality at the university of Cagliari.

First of all, a documentary analysis related to the current rules and policies on gender equality: the administrative and executive officers contacted to find this kind of materials did not express any form of resistance, rather they've been fully collaborative and effective in transmitting the requested documents.
Secondly, the collection of quali–quantitative administrative data related to the main thematic key-areas of the SUPERA project: also in this case, the staff of the various departments (with particular reference to the Information Technology and the Human Resources ones) didn't express any kind of resistance, neither explicit nor implicit, showing an excellent collaboration and an enthusiastic attitude to make themselves useful for the completion of the required task regarding the organizational functioning with respect to gender dynamics (for example with respect to the analysis on the horizontal and vertical segregation mechanisms within the teaching and research staff, the administrative staff and the student body).
Finally, a survey on gender representations and biases administered to the teaching and administrative-technical staff and the student body, in February 2019. This was the only event in which several types of resistances emerged, on the individual level, with a quite satisfactory response rate, during a four-week window: respectively 29% of the teaching and administrative staff and 9% of the students. There was not enough information to be able to infer that the asymmetry between females and males in the completion of the questionnaire among the student body (72% vs 28%) could necessarily identify a gender bias with respect to the interest in this matter (in the absence of explicit declarations by those who have not completed the survey). In the same way, it is not possible to assume that the distrust towards the anonymity guaranteed by the tool may have played a role in retaining a part of the sample (especially in the teaching and technical-administrative staff) to complete the survey. From this point of view, it's important to recognize and not confuse a resistance explicitly linked to gender issues with other types of resistance, which in this case could simply be linked to the tool of the questionnaire, like the fear of being identified (crossing some simple individual variables, for example) after expressing opinions or declaring personal experiences on sensitive issues, through a survey officially promoted by the university, regardless of the gender issue as such.

Channels, Forms and Levels of Resistance[10]

On the basis of this premise regarding the absence of institutional resistance and the impossibility of necessarily interpreting the failure in completing the questionnaire as individual resistances, some interesting issues emerged from the answers of those who have actively participated in the survey, both among the teaching and administrative staff and among the student body. In particular the open comments section of the survey, at the end of the questionnaire, turned out to be a very rich source of food for thought from this point of view. Hundreds of respondents seized this opportunity of expressing their personal opinion or experience about gender equality in academia, and the analysis of this optional material allowed to draw relevant trends on their attitudes and perceptions, even beyond the set of standard response options proposed by the tool.
First of all, we can outline a first basic distinction between: a) the resistances connected to the very choice of the survey as a tool to detect gender equality issues; b) the resistances connected in general to the topic of gender equality and to the specific contents included within the four main key-areas of the survey (recruitment, career progression dynamics, family-work balance policies, horizontal and

[10] The basic scheme for the taxonomy proposed in these pages is taken from the contents of a training workshop organized by Yellow Window and held by Dr. Katrien Van der Heyden on 31 October 2018 at the Universidad Complutense de Madrid. The workshop, entitled "Building a gender equality plan. The role of participative methods", involved all the project partners, including UniCA core team.

vertical segregation; leadership and decisional processes; gender dimension in research and teaching; prejudices and gender stereotypes, sexism and sexual harassment).
Specifically, as far as "methodological" resistances are concerned, two main issues arose: which is the best choice for concepts and definitions of sex and gender, on the one hand, and if such a technique is really appropriate to deal with sensitive matters like sexual harassment, on the other side. About the first question, the expression of severe resistance in answering the survey was associated to some critical aspects: the *terminology* adopted, implying it would be wrong to use on the same occasion some specific concepts, like gender or sexual identity, which should instead be kept very distinct, in order to avoid the risk of generating confusion or wrong answers; *ethical concerns* on the way sexual harassment has been investigated; the *compulsory* nature of the questionnaire, while at least on some issues it would have been preferable to leave the freedom not to answer at all. A quote from the survey can help clarify this point:

> *It is not clear what you intend to detect through this questionnaire, given that there is a clear confusion and indeterminacy in the use of the terms: at the beginning the concept of "gender equality" is used, then you move on to "discrimination", then to a condition not better defined as a "disadvantage", then to "differences". About all these concepts, very different from each other, there is no explanation of contents and meanings, among which the respondents can orient themselves and choose those to which their answers will refer* (Teaching & Research Staff-TRS, Female-F).

Especially among students, some respondents claimed not to be certain that they have understood several definitions, such as "sexual harassment", asking for clearer and more detailed information on the meaning of some questions to be sure of being able to answer in a really reasoned way and not in a random manner and only because all the answers are mandatory. The correct use of the terms and the agreement on the lexical meaning of the concepts are not secondary points, but rather important feedbacks that oriented all the subsequent communication campaign of the GEP in UniCA.

> *In the section of the questionnaire on undesired behaviors and sexual harassment, I have marked things that still do not bother me, because I did not understand what was meant* (Student-ST, F).

With reference to the suitability of an online questionnaire for the qualitative study of gender equality issues, a sort of resistance focused on the pertinence of this tool for collecting opinions or narratives of subjective experiences on very sensitive issues: it would be a trigger for a strong and justified refusal to responding at all and indeed would be counterproductive for the purposes of more general involvement in dealing with issues of this type.

> *I would like to give some advice for improving the questionnaire. In my opinion there should be a section to ask if the respondent has ever witnessed or ever noticed any undesired behavior regarding gender equality. In this way one could also understand how students perceive the University environment independently of having undergone some sexist attitude (*ST, F).

Moreover, another critical factor was the lack of inclusiveness in the formulation of some questions on the issue of gender equality, where only a binary and heteronormative perspective (male vs female) was adopted, not taking into consideration options related to non- heterosexual orientations, eg in the composition of a couple of partners.

> *I believe it is necessary to include in the questionnaire the neutral or non-binary gender. Not everyone recognizes themselves in the masculine and feminine gender and the mandatory form of this choice does not contribute to the inclusiveness of those who do not belong in one of the two genders. Even recognizing this reality means approaching gender equality* (Student-S, F).

For this reason of perceiving oneself as excluded in some respects from the target audience of the survey, some people expressed a resistance to responding with real awareness.

> *I believe that this questionnaire should not be based only on a gender difference, but on a wider spectrum: sexual orientation, sexual identity, religion, ethnicity. In my opinion, the problem is linked to the prejudice and the fear of the different people, dictated by ignorance (in the literal sense of the term) that at the University, in different sectors, reigns undisputed. Obviously, I appreciate the efforts of UniCA aimed at improving freedom of expression in the academic context, perhaps starting from gender equality will make it possible to gain a better equality for any individual regardless of their differences* (ST, F).

Moving on to the second macro-typology of resistances, related to gender equality as a theme and its specific key-contents, the first level of feedback we have collected may be defined as a signal of "ignorance about facts". These are cognitive resistances, which largely refer to the dilemma "What I Know/What I Don't Know/ What I Think I Know" around this topic, and its consideration in particular within UniCA. Based on the mentioned Madrid training, behaviors such as include: neglecting that gender-based discrimination (still) exists; claiming it's historical or only present in certain institutions but not in the university of Cagliari; minimizing the facts; victim-blaming or fear of victim-blaming; joking about the topic, often with sexist remarks.
In particular, the main resistances expressed through the open comments to the survey have been related to the following seven objections.

1) The risk that an excessive attention to gender equality does not give due consideration to the most correct parameter of merit, regardless of gender, which in itself would therefore be a false problem, as there would be no real discrimination at UniCA from this point of view.

> *I personally believe this project and this questionnaire are not very useful and very ideological. In any case, in my humble opinion, in a society leaning towards progress, the greatest importance should be given to merit and competence without the ideological obsession of the politically correct and without protection ex iure for one sex or the other. That is, if the University announced a competition to recruit a hundred people, I do not believe that there should be 50 men and 50 women to be hired, but the most competent and well-trained among them, which could mean 95 women and 5 men, but also the opposite* (ST, Male-M).
>
> *On the one hand, I believe it is right to protect any person, to guarantee his/her safety and a path that allows him/her to obtain justice if something unpleasant happens; on the other hand, I believe that the more we emphasize the difference between men and women, the more this difference is accentuated, with an effect completely opposite to what one would like. It is necessary to guarantee the safety of the persons, because persons, not because men or women! Just as in any sector we need to look at merit, and not persist in creating these sort of absurd men-women battles!* (ST, M).

2) The risk that an excessive attention on gender equality, and in particular for the rebalancing of women's opportunities with respect to men through positive actions, can create ghettos, and if anything, exalt the vulnerability of women as a weaker sex and in need of additional help.

> *Women must be allowed to emerge without any advantage. Otherwise, they are considered in the same way as disabled people (I do not intend to offend them)* (ST, M).
>
> *I am a woman and I believe that any woman can and must show that she can do the same job as a man, for example. But you have to demonstrate it, not claim to be able to do it just with words* (ST, F).

3) Among the Staff some survey participants declare that at the University of Cagliari (and even in the Italian society) gender equality is already a reality; the argument, is mostly based on personal experience, more often by male (example 1) but also by some women (example 2), revendicating equality also not being considered different and refusing the "weakness" prejudice associated to femininity, defining women as a category to be protected.

I totally refuse that, within the administration in which I work, there is discrimination or inequality. Never seen anything like it, what a huge nonsense! (Technical-Administrative Staff-TAS, M)

I never felt discriminated, nor I want to be considered a victim to be protected and favoured just because I'm a woman. We are all equal and must have the same possibilities: we are not weak beings to be protected like a "protected category". At the University of Cagliari (and even in the Italian society) gender equality is already a reality. (TRS, F)

4) The issue of gender inequality would be obsolete and no longer occur, especially at UniCA.

In short, the real gender struggles are those of several decades ago. Today we should struggle for other issues, like the right to an epidural or to treatments for certain diseases that affect women or men. Emphasize the difference between men and women even where it does not exist generates hate, atomism, inability to make a common front for far more serious problems in our society. Gender violence exists, unfortunately, of course and it should not be neglected, but I think that now that battle is being done in the worst way (ST, F).

Gender equality has already been largely achieved by giving women the possibility of living independently (something almost impossible in the past). All the rest are customs and traditions that change from country to country and characterize the cultural variety of a population (ST, M).

5) The sexism that is talked about so much would be a false problem, used instrumentally by women to take advantage of it, if anything.

I must confess that what worries me (perhaps because I am doing a thesis on gender issues) is also that our reaction as women to gender impartiality is, sometimes, an expression of male chauvinism or anyway a strengthening of male chauvinism. I want to quote an episode related to a day in which there was an exam: "L. you are fine with your skirt" "hehe, I know, it's short! Guess why I put it". L. was referring to the fact that with that skirt she would have given the exam more easily because her professor, as a man, would have liked her more and would certainly have appreciated a short skirt, a red lipstick, a sweet look. For me the problem of gender equality lies in those who exercise it repressively over others, and in those who bend it to their advantage (ST, F).

I think it is essential to avoid any form of gender victimization aimed at achieving an agenda, whether it is performed by a female or by a male (ST, F).

I would like to point out that in my university experience, as a woman, I believe I have suffered more discrimination from women than from men. I believe that any awareness- raising actions should also be focused on this aspect, namely that if there is no complicity, collaboration and solidarity between women, we are starting from the wrong premises. I believe that the competition that exists between female colleagues and female professors is one of the problems that makes the climate within the university less friendly (ST, F).

6) In the worst-case scenario, this kind of disparities would occur elsewhere, not at UniCA.

Unfortunately, there are still places on the planet where the rights of so many people are trampled on for gender reasons. Luckily, this does not happen or in any case rarely happens where I live. A man and a woman in the western world can do what they want of their lives, but this topic often is over-exposed in the media although I believe that there is no emergency in this regard, indeed having made great strides especially in the last 50 years. There are other topics to be considered as priorities with respect to this one, both at national and university level. I also believe that this excessive attention to the gender subject has in the long run as a result the opposite effect than the prefixed one. It is time that everyone takes their responsibilities, without useless assistance, both men and women, and this is my idea of equality of gender (ST, M).

> *I consider this a delicate matter. Sometimes we come across a forced gender differentiation that risks further accentuating the differences. The argument I believe should not be presented as a social overthrow of imaginary barriers, but as a cultural overcoming of individuals and social contexts in which we want to operate. Precisely, I believe that doing seminars on gender differences in a place like the university, where a collective conscience towards the problem already exists, is substantially useless, also because the staff is 80% female. The question is found above all in work environments, where there is no careful management of people by qualified personnel. The commitment must be at 360 °* (ST, F).

7) The problem is minimized or reduced to a joke with vulgar or sexist comments tending to victim-blaming.

> *Wow, what a waste of time! I thought to find some questions on the difference in pay or mortality rates and instead always the usual stereotypical questions "Have they ever harassed you ????" "Did you receive different treatments just because you have tits???". You are pathetic, give yourself a wakeup call, you are pissing me off* (ST, F).

> *Only women complain about discrimination (only a few, stupid women, not as women, but as ignorant people). As a man, personally I have never seen partisan attitudes against women at the university, but I have heard female colleagues complaining male chauvinism just because they failed in exams on which they were not prepared, and I witnessed that! And the same women claimed to go half-naked to an exam because the teacher was a maniac, so they passed it! So the sex equality is right, but it is getting out of control because it is used as a tool to extort more and more, and not to be equal. Since we are already equal* (ST, M).

> *The only forms of gender inequality that I have suffered have been performed by filthy professors who, when they see a beautiful girl, ask easier questions during an oral exam and therefore give a higher grade than a male with the same preparation. But it is normal: the world is controlled by the pussy and we have to accept it!* (ST, M).

The second level of resistances related to the specific contents of gender equality, as a matter of debate, constitutes an explicit denial of the problem. These are axiological and emotional resistances, which concern the attribution of meaning and value to the issue of gender equality, due to the assumption "It is not important/I do not care". Based on the mentioned Madrid training, behaviors such the following ones fall into this type of resistance: claiming the outcome of gender-based discrimination is the result of a biological predisposition and thereby refuting that these individuals' behavior is driven by societal expectations about their gender roles; blindness to harm caused by gender stereotypes; blindness to psychological cost of gender-based discrimination; general minimization of the effects and putting it low on any priority list (saying there are more urgent matters to tackle. In particular, the main resistances expressed by several students and professors through the open comments to the survey have been related to three different ways of interpreting the denial of this issue as a problem:

1. The Problem Does Not Exist. The formulation of this resistance could be expressed, for example, in the following ways

- An explicit rejection of feminism considered a sterile and obsolete ideology which in any case does not concern those who completed the questionnaire, who claim not to attribute any value to this topic, which therefore would not be a real problem at all; they express refusal also of any definition of gender, considered a form of ideological categorization completely useless.

> *I believe that the concept of gender equality should be universally recognized, in my opinion there is no position, faculty, etc. that it is more suitable for one sex than the other. I believe that everything must be focused on the merit and skill of the individuals. The imposition of the pink quotas or other positive actions only for women, like the double male/female preference in the elections or in the*

representative institutions, from the simplest to the most complicated ones, are just a way to force the system that does not reward the merit but the sex. It is no longer an incentive for gender equality based on meritocracy but rather becomes an untitled abuse and a damage for the male sex and for all women and all men who have the right to hold a position or whatever. In essence, I am overly opposed to feminism, I am absolutely in favor of overcoming the concept of male chauvinism and feminism and therefore favorable to this sort of gender equality, that is the one that rewards those who deserve, without looking at whether you are a man, a woman, a gay, a trans, bi-sexual etc. (ST, M).

I believe that gender equality in this sad society is a must. But more generally I think it is completely useless, or better: the concept of gender is so weak that it is useless for it to exist. No men and no women. Only people or individuals. In this sense gender equality is useless, because gender should not literally and grammatically exist (ST, M).

Gender equality (or equal opportunities) already exists in Italy. It is not up to the university to teach these concepts but to families. It is not wrong to say that this test was inspired by the distorted view of what feminism is in other states (especially USA). Gender equality has already been achieved here and there is no need to continue this charade (ST, M).

- Other ways of expressing disinterest or an explicit refusal to assume this is a real problem, rather than the smart coverage of differences in achievements that have nothing to do with gender, so women should stop once and for all to complain about it.

Gender equality does not mean equality. Addressing people of mixed gender with plural masculine words is a grammatical convention. In my faculty (Engineering N.dR.) I never witnessed any kind of gender disparity, but a few people would be able to complain anyway (ST, M).

Gender equality is a poor and superficial matter, totally in opposition to the meaning that my morality attributes to the concept of equity and equality among individuals. Gender equality diminishes the individuality of human beings and is a concept on which weak and non-critical people take refuge (ST, M).

- If gender asymmetry exists it is a natural consequence of biological differences, because males and females are in themselves complementary and what happens would therefore be a fact that is uselessly challenged just to create problems, that don't exist indeed.

I believe that gender equality in rights and obligations is one of the founding pillars of a civil society. I also believe, however, that extreme "protectionism" in favour of a gender considered to be falsely weak opens the door to false equality. To emphasize, to oblige, to categorize a certain thing on the basis of gender, even if with the most noble aims, is still a deepening of this disparity. This excessive behavior (to speak all the time of femicide, to bend the Italian language to the issue of gender equality) is however the result of a paternalistic mentality that still sees in the "weak" sex something to protect, which is not an achievement at all for women! The differences between genders exist and it is stupid to argue the opposite, from a scientific, psychological, cultural, etc. point of view... Differences should not be resolved, they must be known so that they do not become sources of disparity. The differences make you grow (ST, M).

I think gender equality is not writing "Capa" (NdR. "Female Leader" in italian). In fact it is just a form of violence perpetrated against our language). Gender equality is having the opportunity to do the same things but also understanding that men and women are different, because we are all different, with different qualities, with different dreams etc. Gender equality is giving the same opportunities, but not for this reason we must consider ourselves interchangeable. Diversity is our strength (ST, F).

I was quite thrilled with the importance being given to "gender equality". Exaggerated for several reasons. The social behaviors are now increasingly diverse and libertine, we find women who have

> *male behaviors and men with female behaviors. I also think it is stupid to ask a male how he would behave in situations of harassment. The male is biologically a sexually active animal more than a woman, this is irrefutable. The male has always been in nature with a high testosterone, especially at certain times of the year. Asking a male to remain calm or to avoid having sexual urges is like asking an animal not to be aggressive. Chemically and biologically speaking it is impossible due to internal hormone levels. Asking therefore to have an absolute sex equality is an absurd request and out of any natural logic* (ST, M).

- The issue of gender inequality would be totally useless, and therefore cannot be a real problem.

> *Gender equality can be a good thing in some ways (it is right that for the same performance, a woman should be paid as much as a man), but quite useless for others (I consider more serious the physical violence of a man on a woman compared to the other alternatives, although the violence is always unjustified and always to be avoided, except in exceptional cases* (ST, M).

> *We study computers, those problem does not arise much in reality, but nice try (NdR. Sciences)* (SR, F).
> *I found this survey and project extremely useless, and breaking the gender language is a useless battle* (ST, M).

2. There is a Problem, but the survey formulates it in a wrong way and starts from inverse biases with respect to gender. Therefore, those who have completed the questionnaire disagree with this interpretation.
- For example, the Survey would assume default that the household chores are necessarily asymmetrical to the detriment of the female partner, and never the opposite and this is a wrong and counterproductive way to deal with this issue, because it blames one sex against another, instead of reasoning in an inclusive and non-dichotomous way.

> *The continuous use of political correctness by UniCA is counterproductive, and, in my opinion, get the opposite result, because in fact it only accentuates gender inequality, given that many times women-friendly events and the distortion of language for "gender equality" sake can easily be transformed into "giving more weight to the female gender"* (ST, M).

- Not everything that is presented as a symptom of sexism really is, and even to pay attention to these issues would only amplify hysteria and hypocrisy, ending up missing the point or concealing the cases of sexism in the opposite direction.

> *I believe there is a limit within which these issues are significant. Let me explain better: it is true, we could carry with us cultural aftermath of a past without gender equality; probably in the workplace wage differences or unequal treatment still persist; this must be fought. But we must know how to separate things!!! Certain other arguments, such as the language, or the criminalization of sexist jokes are sometimes ridiculous. I believe that while some are serious acts of inequality, others are shown as such but do not constitute them at all. On the contrary, the mere fact of identifying them as chauvinism creates gender inequality. All this is equally serious: the taboos that our society has built over time must be torn down* (ST, M).

- At this level of resistance, we can relate some consideration of Staff participants to the questionnaires, denying the problem of gender inequality at UniCA, either suggesting (more often women respondents) that it is not a working problem, but rather an individual or familiar one (ex. 1); or remarking that the real problems of inequality are related to other, more urgent issues (LGBTQI rights; different distribution of academic power in the Italian territory, individual needs) (ex. 2).

> *I believe that the University of Cagliari, at least in my personal experience, is not an environment where sexual discrimination exists. I live in a reality where men and women have the same*

> *opportunities and if a woman has given up, it was for personal reasons and not because of her gender.* (TRS, F)

> *In our university, as in others and in the university world in general, I believe that discrimination – especially in academic careers – takes place on the basis of other logics than that of gender (...) A different issue is that of human and social relationships: abuses can occur, and we have to make all those who are or feel weak to feel safe from any prevarication and assisted by the appropriate psychological structures of the university.* (TRS, M).

3. There is a Problem, but there are far more serious problems to be tackled as a priority.
- There is a shift of the focus on other issues, other structural problems in the University or in society that would be much more urgent to address than the issue of gender equality.

> *Gender Equality is a utopia. I find this subject stupid, and I think we shouldn't waste time on these things. The university must improve many things about its whole organization, nor this one!* (ST, F).

- From a subjective experiential point of view, it may be that the respondents to the survey have become aware of discrimination dynamics, but also at the individual level the relevant issues are other, and on those we would require greater attention.

> *This is a cute initiative, but now you must concretely worry about problems like the cleaning of the bathrooms, the absence of toilet paper, the cleanliness and decorum of the classrooms, the conditions of abandonment of the parking lots, the quality of food in the cafeteria, the architectural barriers and the lack of means of transport that weigh on students and staff regardless of their sexual orientation* (ST, M).

The third level of resistances related to gender equality, as an ethical principle, express a strong denial of changeability. These are resistances connected not so much to the recognition of the problem or its importance as to the solutions to counteract it, which are assumed to be inaccessible and, in any case, not very useful, because these dynamics are too deep-rooted and structural for us to think of having an institutional impact. Based on the mentioned Madrid training, behaviors such the following ones fall into this type of resistance: perception of "that's how things are", while under-estimating the institution's own responsibility; feelings of despair and passivity; fear of reverse discrimination; victim-blaming. In particular, the main resistances expressed by several students and professors through the open comments to the survey have been related to the following three issues:
1. Expression of a widespread and general lack of confidence in this type of initiatives, both informative and educational, because in any case "things go like this" and discussing the issue of gender equality would be just an empty exercise or a useless loss of time. The proposed solutions are only cosmetic and substantially completely irrelevant (with particular reference to the adoption of a gender-sensitive language).

> *In my opinion it is more appropriate to promote meritocracy and gender equality by focusing more on facts than on language. It is useless to promote a "politically correct" language if reality does not reflect the values that this language takes into account* (ST, F).

> *I disagree with the destruction of the Italian language in the useless effort to adapt words from the masculine to the feminine, or in the optional insertion in each word of different endings separated by a bar. It is not with the distortion of the beauty and fluidity of the Italian language that the problems linked to gender inequality are solved* (ST, F).

2. Fear of discrimination on the opposite direction due to undue privileges for women, following a perverse effect of positive actions or benevolent attitudes towards them to the detriment of men.

> *In the scientific field, the obsession with gender equality is reaching paroxysmal levels. Outreach programs, study and research funds reserved for women lead to favoring the career of the few female students compared to the most numerous male colleagues. The result is that the competition in the male field remains real and meritocratic while in the feminine field there is a tendency to favor everyone only for being a woman, regardless of scientific merit. If there is a cultural problem, one cannot think of fighting a disparity with the opposite disparity. This relatively to the "quantitative" gender equality. On violence and discrimination, of course, all my support. (ST, F).*
> *Gender equality (as always) is a subject that is treated only from the point of view of the "poor and unfortunate women" in a male-dominated society (nonsense!). The rights of men are always in the background* (ST, M).

3. Several of the comments that can be related to this level of resistance refer to the perceived tension between equality of opportunity based on merit and gender equality policies differentiating between men and women (such as affirmative action or gender sensitive language application). In the case of men, the main fear is represented by reversed discrimination, given by the favouring of female colleagues having lower competence on the exclusive basis of their gender, following a sort of revanchist logic asking men to experience what women have suffered in the past (see ex. 1.a; 1.b); also several women fear the perspective of being judged and making a career on the basis of their gender, rather than on their merit and competences, which they wish to defend within an equal treatment framework and a "may the best win" logic.

The last level of resistances related to the very topic of gender inequality reveal an underestimation of own capacity to deal with it. These are resistances expressed in an extremely personal form, bringing back the sense of powerlessness with respect to this problem from a subjective point of view, as if any possible effect of one's own contribution in this regard was denied. Based on the mentioned Madrid training, behaviors such the following ones fall into this type of resistance: lack of interest and/or power in the group; passive aggressive behavior (not doing anything).

In particular, the main resistances expressed by several students and professors through the open comments to the survey have been related to the following three issues:

1. Perception of institutional invasiveness in dealing with a such sensitive issue as discrimination, which is substantially private, and therefore resistance to explain one's own affairs, especially the most delicate ones, and in general to expose oneself with too clear opinions on this matter (choosing neutral, random and irrelevant answers to the survey to protect themselves and their privacy).

> *In the section of the questionnaire concerning attitudes, I was not able to give truthful answers, because I think that this is a private matter* (ST, F).

2. Perception of the uselessness of personal opinions on these issues, as a symptom of passivity, discouragement and resignation ("I do not say and I do nothing with respect to something that I cannot change in any case, I limit myself to detecting it and acknowledging it, and I'll try to do my best in order to find myself in this type of situations as soon as possible").

> *I must admit that I have already heard of your questionnaire from some of my male colleagues, who are more refractory to any issue concerning gender equality. In general, although I consider the awareness-raising initiatives rather laudable, I fear that ultimately they are not useful in reaching that part of the public that hinders them the most.* (ST, F).

3. Perception of disorientation with respect to these issues, related to the lack of information on what can be done on an individual level (eg. by declaring that they don't know which channels are available at UniCA to report cases of harassments acted by teachers, although there is already the possibility of doing so through a specific evaluation form, or by declaring that they don't have any knowledge about the University regulations on the gender equality issues, in case of need to make

use of them). The result is a sense of detachment with respect to the institution, which translates into generalized distrust and inaction.

> *I admire what you are trying to do but I also think that at the university you should arrive having already in mind the rules of civil life. I think that first of all education should start within the family or otherwise outside the school. Because you are born and you begin to learn a long time before, as you will know. I also think that a person who has arrived at the university should already be able to understand whether what he/she does is right or wrong. What I am trying to say is that as you know (again) it is more difficult to change a wrong thought or behavior if it has long been rooted. Surely also the way in which someone else's action / attitude / comment is interpreted is relative and also in this case it must start from an out-of-school education. It is commendable for the university to hire available consultors and psychologists ready to listen and to help. The problem is that any inappropriate behavior should be "eliminated" before entering the university* (ST, M).

In sum, our attempt to define a taxonomy of resistances, based on the feedback we collected during the design process of UniCA GEP, has been a very useful starting point to understand where and how to focus the actions and strategies necessary to develop an approach as participatory as possible in the next steps of co-creation of this tool, up to its formal approval and adoption. In this respect, to distinguish and correctly identify all types of resistances, with respect to the issues related to gender equality, proved to be crucial, because failing in recognizing in time these critical nodes could have blocked the implementation of the GEP throughout UniCA as an organization.

So how does the story continue? Starting from the critical issues identified and discussed in the preliminary stages, how did the participatory process of co-creation of the GEP develop?

The GEP design as a participative process

The Italian university context is governed according to Public Administration logic, less according to managerial logic. Rules and procedures, mainly guided by administrative law, are combined with the use of management tools. In such an organizational context, structural changes that are proposed "from the bottom" need a strong legitimization "from the top", and -once accepted- they have to be transformed into new management logics and policies, expressed in specific official documents. This is the reason why a strategic choice was made both in identifying the members of SUPERA core team at the University of Cagliari and in identifying the members of the HUB, who hold strategic and leadership positions in University of Cagliari. These two teams can be conceived as two rings of different radius that constitute the operational structure that the University of Cagliari has equipped itself with, as part of the SUPERA project, to activate the design and implementation process of the GEP. The first, the core team, is made up of fifteen people with different background, role and responsibility, who represent different departments in a multidisciplinary perspective. The second, the Hub, is a network of selected "allies", made up by 12 people with leadership roles at the top of UniCA organigram, representing its whole community, especially after the recent inclusion of students' Senate/Board representatives.
This choice allowed us to influence and push towards a process of cultural, structural and organizational change. To design the UniCA GEP the core team has considered, from the beginning, that gender equality is not a neutral and standard area to initiate institutional change, but at the same time could be considered as a valid strategy to identify those activities that could interfere with processes and practices in use, which are highly gendered (Benschop and Verloo, 2011). The links between gender inequality and structural issues in HEIs have been studied widely (Benschop and Verloo, 2015; van den Brink and Benschop, 2012). Structural change approaches go beyond re-balancing opportunities for women and men and seek equality of outcomes (Benschop and Verloo, 2011). In light of this consideration, the UniCA core team was forced to reflect and identify key actions that would allow them to strategically and constructively address the fundamental norms and

values still prevailing in academia. Considering the assumptions, the processes put in place to build our GEP led us to focus on strategic choices and to think about what could be accepted or negotiated with the Rector, Senators, and our academic community. Using GE's baseline assessment has been helpful in opening Pandora's box on gender issues in our university context. Starting from GE's basic assessment to open Pandora's box on gender issues in our university context, the core team assessed and decided to continue the work by favoring on the one hand activities that would allow to redefine regulations and procedures, on the other, through regular meetings with the HUB to open scenarios in which issues relating to gender equality would find an adequate space for constructive and participatory dialogue.
Basically, we have considered the university as a community of practice (Wenger, 1998; Hart, et al., 2013), in which participation allowed all members to socialize, in a guided and supported way, with new management logics that take into account gender equality, on the other hand to have a strong sponsorship from the top that would ensure legitimacy and support for change.
Similarly to other EU SwafS projects on gender equality (see for example Sangiuliano, Canali, and Madesi, 2018), the design of the SUPERA project was guided by a theoretical framework based on socio-constructivist gender theory, considering gender as a constitutive part of organizational practices (Acker, 1990; Benschop, 2001; Gherardi, 1994), therefore capable of influencing rules, procedures, social interactions, and discourses.
In SUPERA project, participative process has been the best way to ensure that a wider spectrum of the academic community members accepted changes (Rowley et al., 1997). Starting from the consideration that people almost always support the changes that themselves have proposed, the choice was to involve all the people concerned by role and competence in the various stages of decision-making processes.
All the steps were guided and coordinated by the SUPERA core team, to which also the authors of this paper belong, giving us the possibility to start the process internally but at the same time to obtain from the "bottom" consensus and important inputs from different categories of the university environment on specific topics, in the form of four fab labs: two of them involved administrative staff to discuss the issues related to work-life balance, the third involved Ph.D. students to discuss about career progression, and the last one was with assistant professors and dealt with sexual harassment. We have preferred fab labs rather than online platforms as more effective tools to guarantee inclusiveness and maximize the participation of representatives of the whole research and academic community in the decision-making process. We also organized several meetings with SUPERA Hub, allowing us to manage organizational resistance and obtain consensus from the "top" to govern the proposed change processes through the introduction of specific actions to be implemented through the GEP. We can say that the people we involved represent the complete community of UniCA.
The GEP design and approval process involved all the parties that make up the university and lasted about a year.

The end is the beginning: the articulation of the GEP as an output to guide structural change in academia

Several studies have focused on gender inequalities in academic and scientific careers by concentrating on the under-representation of women in STEM careers (Science, Technology, Engineering and Mathematics) (horizontal segregation) and their under-representation in top positions (vertical segregation). Many contributions have focused their attention on the phenomenon of the glass ceiling in academy, highlighting the mechanisms that feed the invisible barrier placed in the final phase of university career that prevents women from becoming full professors (Van den Brink et al., 2012; Marini et al., 2018). Other studies have investigated "tenure", precarious and temporary positions (Murgia, Poggio, 2018). Women in academia, in fact, encounter obstacles along all career stages, including the initial ones, and often cannot find a stable position and are forced to leave (Le Feuvre et al., 2019). The dimensions involved in processes of gender discrimination in

academic are many and different (Solera, Musumeci, 2017) including work– life interferences (Bozzon et al., 2017). Recent research (e.g., Casad et. al, 2020; Monroe et al. 2008; Santos, Horta, Amâncio, 2020) attributes gender inequalities in academia to factors as numeric underrepresentation and stereotypes, lack of supportive social networks (see for example Fisher and Kinsey, 2014), and chilly academic climates (Clark, Blickenstaff, 2005) and propose as solutions to this problem organizational changes focusing on recruiting policies, promoting women networks (e.g. mentoring, professional development), and improving academic inclusive climate (e.g. training, leadership, et.). Starting from the integration between these studies and the preliminary data of the survey mentioned above, the GEP has gradually reached its final form. It includes 32 actions started in the last months of 2020 and which will end by the end of 2024. It is possible to divide the set of activities contained in the GEP into four key areas:

1) recruitment, maintenance, career progression, work-family balance policies (horizontal and vertical segregation);
2) leadership and decision-making processes (accountability, transparency, inclusion);
3) gender dimension in research and teaching;
4) gender prejudices and stereotypes, sexism and sexual harassment.

These key areas are divided into specific actions and for each action the following is indicated: goal, sub-actions, direct and indirect target, responsible for the action, output and outcome, timing.

Recruitment, maintenance, career progression, work-family balance policies

The starting assumption of the actions included in this key area is that acting on the processes of recruitment, maintenance, career progression, and promote work-family balance policies allows you to act on phenomenon of horizontal and vertical segregation, and to counter gender discriminations.
In order to implement strategies aimed at promoting UniCA as an inclusive organization, one of the first actions of the GEP is the collection and systematization of quantitative and qualitative data disaggregated by gender and the creation of an integrated system useful for gender statistics. Gender statistics identify and produce data reflecting the realities of the lives of women and men, and underline policy issues relating to gender equality. Gender statistics play a crucial role in the identification of gender sensitive policies, in that allow to make visible, gender gaps, raise awareness about gender inequalities, to monitor gender equality and promote achievable change (Decataldo, Ruspini, 2016).
One of the main objectives of our GEP is obviously to help reduce the starting gaps as much as possible by enriching the existing strategies in UniCA to favour the work-family balance. Many women abandon university careers because of problems in balancing work and family (Forster, 2001). Several studies have investigated the obstacles in work-family balance in academic, stressing that in often the two domains (academia and family) are perceived incompatible by women researchers (Bozzon et al., 2017). Women researchers manage the difficulties linked to work-family balance leaving their academic careers (Glover, 2001) or alternatively deciding not to have children (Blackwell and Glover, 2008).
One of the difficulties is related to return to work after parental leave, in fact, many women leave university career after marriage and the birth of children (Glover, 2001). UniCA complies with Italian legislation on compulsory maternity leave and optional leave for biological and adoptive parents (paternity leave, parental leave, rest for breastfeeding, child sick leave). The data (detailed information on any type of leave is available at the university website in transparency manuals) show that after a first “free period” of parental leave (30 days for Administrative staff and 45 days for Faculty members) there is a decrease in salary, which drops to 30% of the full amount. As confirmed by the interviews with the Personnel Office and the administrative data available, parental leave is not used much by Faculty members. Instead, among the technical and administrative staff there is a greater use of parental leave. Just to mention one of the actions envisaged in this direction, we mention the support provided upon returning to work after parental/sick leave, aimed at maintaining the career

path, through the definition of an internal regulation that establishes work facilities (for example, a reduction of workload in the 12 months after return) and specific assessment criteria (in the case of personnel subject to assessment) for workers who return to work after the birth/adoption of a child or after a period of illness.
Since 2015 UniCA is committed to pursuing family-friendly policies, whose direct beneficiaries are students and personnel (research and teaching staff and technical and administrative staff). We can mention, for example, the Baby Card (see https://www.unica.it/unica/it/studenti_s08_ss06.page) and Pink Room (see https://unica.it/unica/it/studenti_s08_ss07.page and https://www.unica.it/unica/it/news_notizie_s1.page?contentId=NTZ151997) Projects that aim to promote study-life balance and work-life balance. In March 2021, Unica inaugurated the company nursery, which will welcome the children of students in particular (see https://www.unica.it/unica/page/it/lasilo_nido_di_unica). There is evidence of a gradual but steady process of institutional learning within the domain of family-friendly policies. The ultimate goal of promoting gender equality, both in terms of quality of services offered and quantity of potential beneficiaries involved, can be achieved only through the constant monitoring of the ways in which these practices/policies are implemented. The collection of administrative data about the number of potential beneficiaries, the actual use of the services and the dissemination of transparent information about the services to prospective and current students are fundamental for estimating the effect of the policy and suggesting further improvements. During the designing of UniCA GEP we have explored the work-life balance policies and tools set out by the University for its staff and students. In fact, a sub-action has been included within the GEP which provides for the periodic monitoring of the work-life balance policies and tools set out by the University for its staff and students, with the aim of improving and enriching the services offered in line with the real needs of the beneficiaries.
A further objective in this key area of the GEP is to develop knowledge and skills on gender equality throughout the UniCA community through mentoring and training, and through the establishment of an interdepartmental center for research on gender issues that can promote international workshops and conferences.
Mentoring activities by senior colleagues are useful to ensure that junior academics' personal goals are consistent with the institution's expectations. Many studies focused on the different scientific productivity of men and women (Abramo, D'Angelo, Caprasecca, 2009; D'Amico et al., 2011). Filandri and Pasqua, (2019) showed that gender differences in publication output could explain the lower percentage of women among associate and full professors in Italian universities. The same authors underline that the gender gap in Italian academia could be related to women's reluctance to apply for promotion. The women therefore are less likely to apply for high-responsibility jobs and career advancement, and, specifically for academia. Again, to counteract gender discriminations it is necessary to promote policies to sustain women researchers for example through mentoring and training activities, work-life balance services. In recent years mentoring has become one of the interventions used in organizations to manage difficulties linked to the specificities of women's career paths (Agodi, Picardi, 2016). Mentoring as actions plans to promote gender equality in academia are effectiveness when properly integrated in a institutional agenda to gender equality (Agordi, Picardi, 2016), as the case of our GEP.
Therefore, the planning within our GEP of paths aimed at supporting women researchers' careers through mentoring activities, through the identification of peers within all structures, appears as a valid tool to reduce the asymmetry of opportunities that bind women more in reaching top positions. It's still, to reduce gender gaps, training actions are planned on the influence of gender bias in professional and career choices aimed at students and PhD students, and awareness-raising courses on gender equality policies and practices in the university aimed at teaching, technical, administrative and librarian staff.

Leadership and decision-making processes

The assumption that guided the choice of actions included in this key area is that acting on leadership and decision-making processes to promote gender equality ensures that the actions themselves are integrated with organizational policies and that they are put into practice over time.
Institutional change is a strategy aimed at reducing barriers to gender equality by adapting institutional practices. The objectives in this priority area aim to bring gender equality to the institutional level: the inclusion of gender equality issues in the organizational structure and strategic planning and mission of the university, the implementation of measures and practices gender specifications and existing procedures in which gender equality issues should be considered. To implement the various actions of the GEP it becomes strategic to invest in the figures relating to the institutional top: for this reason, we have considered fundamental an institutional figure who appoints the rector with the delegation for gender equality and monitoring, thus functioning as an agent of change (Kanter, Stein and Jick, 1992). Furthermore, to improve internal decision-making processes with a view to gender equality and increase the presence of women in top positions, the activities included in the GEP will be integrated with the measures of the Strategic Plan and the Positive Action Plan of the University. GEP also identified the need to offer training to staff involved in leadership positions. Organizational behaviors of leaders (and top management) directly influence actions that bring about change (Gilley, 2005; Howkins, 2001). The role of leadership is crucial in gearing organizations towards inclusive values, fostering inclusive cultures and bringing about change.

Gender dimension in research and teaching

The mission of the university is divided into two main directions, research and teaching, for this reason it becomes central to promoting gender equality in academy by planning actions aimed at promoting gender dimension in research and teaching.
Managing the communication of a research institute is a multifaceted challenge. Universities are, at the same time, learning environments, places where scientific research takes place and places of work for large communities of people. Teaching, research, dissemination, public engagement, fundraising, promotion of enrolments and creation of partnerships are just some of the tasks that a university must manage according to its mission and values. In this scenario, universities must be places where knowledge can be developed and shared at the highest levels, guaranteeing academic freedom and visibility to all actors involved, including those less represented due to their gender. In this sense, universities play a fundamental role in communicating the importance of the principles of fairness, inclusion and appreciation of differences in their organizational messages and behaviours. As reported by the League of European Research Universities (LERU) (2015, p17), the European Commission Directorate-General for Research and Innovation has underlined the need for sex and gender analysis. Any research oriented to people's needs or behaviours has a gender dimension, but this is not easy to explain to people, like researchers, who are proud of their intellectual freedom. The same happens for professors, who could see their freedom to decide course programs threatened.
About teaching we decided to work at voluntary level, creating discussion groups for professors interested to give (more) room to gender related dimension in their syllabus, for example with regard to the proportion of women authors mentioned in their bibliographic references. In these groups, gender studies can be deepened and what it means to use a gender perspective in general research and in specific research within the different disciplines can be discussed.

Gender prejudices and stereotypes, sexism and sexual harassment

In order to deconstruct gender prejudices and stereotypes, the GEP provides training and guidance activities aimed at academic staff and students repeated over time.
The “androcentric” approach of the Italian language reflects a historically persistent social situation, inevitably induces judgments that diminish, downsize and penalize the positions that women occupy in society (Sabatini, 1987). Sabatini recommends a non-sexist use of the Italian language (1986,

1987). In rigid communicative contexts such as institutional ones, reflected in the legislative texts and in the legal language as a whole, it is difficult to detach oneself from traditional codification, and therefore from the predominance of the masculine grammatical gender (Robustelli, 2000). It therefore becomes important to promote actions related to institutional communication. Institutional communication plays an important role in promoting an inclusive approach, incorporating equity, openness and inclusion as core values (Robustelli, 2014). In line with these reflections the GEP foresees the definition of guidelines on gender sensitive communication which could be adopted by the university. A gender-exclusive language is linked with sexist beliefs and attitudes (e.g., Swim, Mallett, Stangor, 2004). The adoption of an inclusive institutional / administrative language and the planning and organization of communication campaigns must be well balanced from a gender point of view.

The theme of sexual harassment in the contexts of study and work in general and specifically in academia represents a topic that is still not much discussed and debated. In order to prevent sexism and sexual harassment, the GEP proposes an adaptation of the Code of Ethics and of Conduct in terms of gender equality and an update of the procedures for reporting discriminatory behaviours and situations of sexual harassment. In addition, the GEP invites to introduce the theme of sexual harassment in the opportunities for discussion and training aimed at students, doctoral students, and academic staff.

As the main output of the process described in these pages, UniCA's GEP is now available as an open access book at https://unicapress.unica.it/index.php/unicapress/catalog/view/978-88-3312-021-8/17/312-1

But, as we said, this is only the beginning of the story, from now on at the University of Cagliari.

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Working Conditions and gender discrimination in the Hard Sciences Sector: the case of National Institute of Nuclear Physics in the South of Italy

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Abstract
The paper analyses the phenomenon of gender discrimination in the Hard Sciences Sector. Our purpose is to discover more hidden dimensions of the discrimination phenomenon, such as the implementation of organizational models, the time management, the productivity indicators, which all refer to men workers. The sample used is the universe of INFN (National Institute for Nuclear Physics) in Naples, a sector of "Hard Sciences" (Physics, Astrophysics, etc...) always known for its strong segregation, both horizontal and vertical (we refer to the underrepresentation of women in the sector and /or in top positions). We used the narrative interviews and the functional analysis to study the characteristics of the workers inside INFN. We interviewed some of the employees at INFN in Naples: researchers, technologists, administrative staff and technicians. The results show that the models adopted inside the organization penalize women and often men too: they affect not so much the conventional discrimination indicators (kind of occupation, wages, tasks to be carried out and so on), but the quality of life of the workers (especially the women); these models find their origin in the way the society and the labor market are structured (e.g. the asymmetry of familiar and house tasks).

1.Introduction

Gender discrimination in the labour market is a complex and many-sided phenomenon. In the last decades we passed from direct wage discrimination to allocative wage one. The direct wage discrimination is in act whenever two groups with the same production characteristics are paid with different wages according to their gender, ethnicity, age, sexual orientation and so on (Becker, 1957, 1985), (Cain, 1986), (Altonji and Blank, 1999).
The phenomenon of allocative wage discrimination refers to the concentration/over representation of workers in specific low-wage sectors (horizontal segregation) and to a concentration/over representation in the lowest levels of the hierarchical structure inside the work organization, which create obstacles in progression in career (vertical segregation); when the segregation is above the 70% we are talking about the discriminatory phenomenon (Bettio, 1990), (Bettio and Veraschagina, 2008), (D'Isanto, 2013). Nowadays is not easy to recognize the phenomenon of economic discriminations, although they deeply affect the life of individuals and create inequalities among them.
The purpose of the following analysis is to examine the phenomenon of gender discrimination in the scientific labour market through new interpretations in order to discover more hidden dimensions of this phenomenon, such as the implementation of work organizational models, of the time management, of the productivity indicators, which are all based on the characteristics of male workers (Rolin and Vainio, 2011). Such models and dimensions penalize women and often men too: they affect not so much the conventional discrimination indicators, but the quality of life being also a result of how the labour market and the society are organized. In these male-dominated environments, women will try to adopt their identity to the perceived gender expectation, such as trying to be one of the *men* (Powell, Bagilhole and Dainty, 2009).
We studied the INFN (National Institute for Nuclear Physics) Naples division. Physics inside *Hard Sciences* (as Physics, Astronomy, Chemistry) is characterized for its strong gender segregation, especially the vertical one, which refers to the underrepresentation of women in top positions.
For our research we used the narrative interviews, adopting as interpretation model the one taken from the clinical setting and applied to work psychology (Di Nuovo and Rispoli, 2011). The aim of the interviews was to gather information about the work conditions of all the employees, and also, to

catch indirectly the existence of gender discrimination mechanisms (Williams, Muller and Kilanski, 2012). We analysed the work organization and some of its operating processes and practices which are incorporated through the thoughts of individuals and their perception of the work environment.
The interviewers were chosen so that they represent a wide range of different employees, from researchers to administrative stuff, to technicians and managers.
The gathered data tell that actually the workers at INFN in Naples are all enthusiast and medium satisfied of their work, even if, also in the research context, it seems that the model of work organization adopted is limited and restricted, unable to value the diversities and the transversal skills, affecting both women and men: there is no evidence of well-known discrimination mechanisms, although many workers feel the pressure of reaching results and goals, especially women. In this study, we wonder if and how the role of work conditions matters in the female well-being leading to a discriminatory phenomenon: to a sort of *gender well-being discrimination.*
Coming from different fields, psychology, economics and physics, we started this research with three different approaches to the study of *women within the work organization*. Gendered phenomena, as many other complex ones, cannot be explained just adding different factors, but need to incorporate and intersect different levels of analysis (Wood and Ridgeway, 2010). The analysis procedure can be generalized to other working context underlying the need of an interdisciplinary approach.

2. The methodology

Gender discrimination and iniquities depend also and mainly on work organization (Acker 1990, 1992), (Aaltio and Mills, 2003). Gendering processes are often implicit in behaviours and practices, which appear neutral, but result in measurable differences in treatment and experiences between women and men. As defined by Acker (1990) these gender differences and hierarchies are produced across four gendered dimensions, all based on masculine values and ideal models: division of labour, relations in the workplace, construction of symbols and interpretations of one's individuality within the organization. These gendered processes can be hidden within norms, practices and values taken for granted, and inevitably represent a disadvantage, a discrimination for those with different values and life experiences and consequently affecting their quality of life. How can we assess the fallout on people's quality of life? The problem of the impact upon the people well-being and work organization is stronger when work and private life merge and blend together.
This research wants to explore the problems from the point of view of the employees who live their working life in the local department of INFN.
In this context, the health condition of the workers is defined not only as the absence of disease, but must include the state of psychophysical well-being, which is a part of multidimensional framework of the organizational well-being strictly connected to the health of the organization. (Di Nuovo and Rispoli, 2011). Furthermore, many authors analysed the complexities of the relationship between women and well-being in the workplace (Lennon,1994), (Ravenswood, Harris and Wrapson, 2017).
To investigate the connection between working conditions, gender organization and well-being we chose the semi structured interviews in order to hold together a theoretical framework and the interviewee's freedom of expression and narration. This has been for us the starting point to analyse how gender is embedded in the organizational logic of the work (Acker, 1990), (Bruni, Gherardi and Poggio, 2004), (Poggio, 2006)
In accordance with the Anglo-American woman scholars (Harding, 1987), (Gherardi and Poggio, 2007), interviews prove to be one of the most fruitful instruments to fulfil a research that wants to be attentive also to gender issues. In a constantly evolving text, such instrument can overturn the relationship between the researcher and the object allowing the interviewer to share a common field where to put at stake skills, experiences and emotions.
We analysed three areas: the working history, the reconciling and the organizational culture. For each area we have devised model questions thought to establish a relationship with the employees of the

Institute. We have recorded the thirty/fifty minutes long 49 interviews, conducted in person, and then transcribed them in full. The interviews took place in offices or laboratories inside INFN structure.
We have processed the data from interviews resorting to the functional analysis (Rispoli, 2008) not looking for *pathology*, or for *therapeutic settings*, but using it as a process of understanding capable of revealing the basic Functioning of the organism-organization of the INFN unit.
The Functional interpretation divide the organism Functions in four large areas (cognitive-symbolic, emotive, morphological and physiological).
In order to outline a complete profile of the INFN Naples unit we used this approach to analyse how the employees (researchers, technologists, technicians and administrative staff) deal with life and work experiences and accordingly how their Functions can be altered. This will enable us to identify the damaged and/or the intact Functions of the Institute.
We have to underline that Functionalism has widely used these methods taken from the clinic psychology to assess the stress within the companies (Di Nuovo and Rispoli, 2011). The Functional analysis is used to examine the individual's abilities and qualification compared to the specific demands and expectations within the private and public organization. We used the functional analysis to give voice to each group (researchers, technologists, technicians and administrative staff) through the voice of the single persons (Lewin, 1947).

3. The INFN context: the sample

INFN is the public Italian research institute dedicated to the study of the fundamental constituents of matter and the laws that govern them, under the supervision of the Ministry of Education, Universities and Research (MIUR). Founded in 1951 - the Institute promotes, coordinates and carries out theoretical and experimental research in the field of sub-nuclear, nuclear and astroparticle physics as well as the technological research related to such activities. It operates in close collaboration with the academic world as part of a wider international cooperation framework. Moreover, the Institute promotes and transfers the acquired knowledge, the competences, the methods and the techniques developed as part of its own research activities, to other disciplines such as medicine, art heritage and environment.
The INFN has a population of 2000 people (data at 2015). The woman employee distribution is roughly 22% among researchers, 13% among technologists, 5% among technicians and 85% inside administrative staff. Among researchers, only 1 out of 10 women is at the top level while this value is double for men.
The research activities are performed in two types of facilities: divisions and national laboratories. The four national laboratories, based in Catania, Frascati (Rome), Legnaro (Padova) and Gran Sasso (L'Aquila), have infrastructures available for use by the national and international scientific community. The 20 divisions are located inside physics departments in Italian universities and guarantee close collaboration between the INFN and the academic world.
The management is almost centralised (governing council) even if each division has a relative independence with its own director.
Regarding gender politics, INFN has its own Affirmative Action Plan ratified by the governing body and an internal Guarantee Committee for Equal Opportunities, Employee Wellbeing and Non-Discrimination which works for equal opportunities and well-being at work.
The sample we used in our studies is composed by all worker typologies existing inside the Naples division. We interviewed 16 researchers (4 women and 12 men) which represent the 53% of the total. researchers, 3 technologists (1 woman, 2 men) which represent the 33% of the total, 4 fellowships (3 women, 1 man) which represent the 21% of the total, 6 administrative (5 women, 1 man), which represent the 60% of the total, and 14 men from technicians, which represent the 87% of the total.

4. Functional analysis: first results on the emotive level

For our analysis the population has been divided in three area: Researcher and Technologist, Administrative stuff and Technicians. For each area, for women and men respectively, we analysed four Functional levels (Rispoli, 2008):

- cognitive-symbolic
- emotive
- morphological (muscular/postural)
- physiological.

In the following, some interview excerpts have been included in italic.

4.1 Researcher and Technologist Area

This area includes staff and fellowships and is mainly composed by men. Many of the researchers and technologists are involved in academic activities which refer to teaching duties (thesis supervisor, lessons, etc). Being involved in international and national collaborations, short and long mobility is necessary; this requirement strongly affects the private-working life balance. The wage difference within the first area is mainly due to career progression and to the greater difficulties encountered by women.
From here on the term "researchers" means "researchers and technologist" analysing them as one category.
Female researchers.
The serenity for doing a good job is threatened, so that enthusiasm for the work often turns into agitation: many of them think that the work load and the bureaucracy affect the job quality and fluency. Here we also have the problem of work and family balance. Many of them tell that the birth of a child made them reconsider their life priorities:

> *[…] after my child's birth, my life changed a little bit. During the first years, I still travelled, later I had to choose a role that kept me here …..without taking some responsibilities (Senior researcher);*
> *[…]I'm not saying that I was discriminated as a woman because it would be too much as it wasn't like that; anyway I'm sure that some people take into account your availability according to sex or to your wish of making a family and…let's say that when they have to choose a person for their group they think that a man will be more available, and that may be true, he will be ready to travel…[…] because a woman will probably wish to have a family at a certain point. It wasn't important, but I felt it… […]In such an environment I had to fight tooth and nail when I came back after maternity leave… […]I took my roles back with a great effort. (Senior researcher);*
> *[…] If my daughter is ill, I stay at home…my commitment is somehow rescheduled according to the needs of the girl… […](Senior researcher);*

The affectionate aggressiveness, that is useful in removing obstacles without getting angry, is a method left aside because women use strongly male ways

> *[…] In time you realize that you have to raise your voice, or if you don't want to, you have to do more… If you are in a meeting or in a commission, where they appointed women by law (gender quota), you are often the only woman …and it's difficult because their criteria are always the same…their way of thinking, or talking…and so you have to find for new strategies. (Senior researchers);*
> *[…] Here, I'm the only woman in my research sector …I'm the coordinator of a group of all men….and men, you know, usually don't accept a woman with superior responsibilities. I had to defend myself, sometimes getting aggressive (Senior researcher);*

Male researchers. Curiosity and interest in their work and new ideas are increased by the excitement that make them work in a productive manner. They show energy to manage positive conflicts and reach results in their research group, and *aggressiveness* not always *affectionate* to remove obstacles.

> *[…] Doing research in a group is a very positive thing because you aim to get a result and conflicts arise only occasionally…sometimes some conflicts may happen and competition prevails […] In such groups the dynamics are very complex…the behaviour is similar the one in the animal ethology…there are "territories" inside an experiment, so it may happen that one invades someone's territory. You measure your strength or weakness…you point at your rival…you may use strong words… this is ordinary work dynamics […]. However we are not so good in group working as they are abroad (out of Italy)…So it's typical to conquer your territory by yourself in small groups and when later on you take over a responsibility you never feel inadequate because it is your own conquest…anyway you are alone (Senior researchers).*

4.2 Administrative staff Area

Women prevail in this Area. Technicians and administrative workers strongly contribute to the life of the Institute. The administrative employees have been working for many years in the Institute (about 20) and can be considered the historical memory since they have been working with several structure heads. The administration area can be seen as the interface between the internal world and the external one, between the internal dynamics and the requests of the external world of bureaucracy.

Emotive level

Women and men. The personal pride and the chance to work in an excellence research centre foster their serenity and their curiosity for the work. Serene relationships with all the colleagues and with the structure head feed the ability to be in contact, which makes the vertical communication easier. A lack of affectionate aggressiveness is sometimes due to the excessive work load which turns excitement into anxiety.

4.2 Technicians Area

Compared to the Administrative Area, here we find only men. The interviews show the presence of two groups in the technical area: the electronic lab technicians and the workshop technicians.
The following interviews refer mainly to the electronic lab technicians, which form a cohesive group. You find collaboration, respect and attention to the colleagues' needs.
In this group the passion for their job prevails. This passion leads the technicians to be updated on the latest technologies.
Nevertheless, to all of them family comes first (quite all of them has a wife or a partner who works) and that is why they turn business trips down

Emotive level.

Positive emotions circulate inside the lab, where there is serenity, curiosity and pride to belong to the lab. However, everything vanishes beyond the borders of it.

5. First interpretations and preliminary conclusions

Who is the one who suffers? Suffering meant as a lack of well-being: it is perceived by the individual in the group and through the group towards the individual; so that if part of the organization suffers, everyone in the organization necessarily does.
The functional analysis, with its measurement methodology, gave us a reading key on the individuals (the employees) and on the work organization (the INFN Naples) dynamics.

The emotive level is more altered in female researchers than in male ones, as when they have to struggle to regain their working spaces «*I had a child and I lost my important place in the experiment…and this affected also my role in it ».*
The work-life balance issue is an evident problem. Female researchers are more involved on remodelling their work in favour of family and the difficulties they face in the advancement of career, the relationship with managers, the regaining of spaces. If male researchers can easily reconcile and live their times because their wives or partners usually don't work, female researchers can do it with a great difficulty and with the help of their old families or external help.
For men, the time never came up as an issue in their interviews, although they look under pression for their career. They can devote their time to the carrier without feeling split in half, and guilty for the time spent at work regarding their family duties or for the time spent at home regarding their job duties. For women, we can say that such a feeling of dichotomy is source of malaise.
It is important to underline that the management of the time is an issue that affects not only married or mother women, but women in general.
In this contest, the anxiety for women translates in stress, that they bring in their everyday life outside the work environment. Men show less awareness regarding their anxiety that generally refers to their carrier differently from women which basically refers to the role divisions.
For the administrative workers the cognitive-symbolic level is distorted because of the excessive work load that doesn't give them the tranquility to perform their tasks. This creates a break between the cognitive level and the emotive one because they feel part of a mission, but at the same time this doesn't turn into personal satisfaction.
The technicians have a scarce sense of belonging to the institute which pushes toward the creation of subgroups with a new balance and new dynamics.
A subtle, but palpable difference between men and women in the history of INFN workers is clear from our interviews. In the stories we told, gender factor acts in weakening the emotive level of women who feel pushed to dress the part of the *other man*, which dims the identity level linking it to the masculine, unable to move towards the feminine. Women have to react to a double obstacle: the gender they belong to and the gender that the society/institution passes on.
Such a double movement made necessary to point out the narrative culture that emerged from the interviews to go beyond the gender trap. A gender structure leads to differences in the opportunities and in restrictions based on sex and affects three dimensions: the individual level, the social level and in institutional one. Following Acker (1992) gender is a number of differences produced by society so that we need to reflect about gender and consider the best possibilities for men and women, to evaluate and discuss them in order to subvert the system.
From a preliminary analysis of our interviews, it arises that the gap in the quality of life and in the time management are possible reading keys for hidden discrimination phenomena inside a research institute, as INFN. What we have learned so far is that these dimensions depend on the job organization model, which derives on how society is structured. This organization doesn't take in to account the different identities and capabilities. The adoption of a gender perspective could give the opportunity to develop new capabilities (Naussbaum and Sen, 1993), (Nussbaum, 2000) and to build new connections, common representations in which everybody can recognize himself (herself) (Kaës,1988).

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Gender disparities in research evaluation in Italy

Arianna Montorsi

Abstract
We present a gendered analysis of the results of two assessment processes adopted by the Italian Ministry of University and Research over the last decade, to allocate research funds and identify researchers qualifying for career progression respectively. The processes are known as Evaluation of Research Quality (VQR, 2004-2010), and National Scientific Qualification (ASN, 2012-2013).
The few criteria chosen for the assessments were different in the two cases, both based on the scientific production of the researchers. In both cases we observe, particularly in bibliometric research fields, that the criteria benefited the male gender. More precisely, in the VQR each structure was evaluated by summing the scores of three selected publications of all its researchers in each research field. Although overall such choice turns out to slightly advantage men, the presence of a vertical segregation is very evident when disaggregating the scores by role (researcher, associate professor and full professor): in each role, women average score outperforms that of men for most research field. Despite such segregation, however, the ASN qualifications did advantage again men in career progression. Indeed, in this case aspirants to the role had to overcome three medians calculated on quantitative features of the publications of researchers already in service. We found that such medians were on average higher of about 10% for men, with a presumed much larger impact in terms of actual promotions.
The present analysis confirms that bibliometrics, like other seemingly neutral forms of algorithmic assessment, can produce gender inequalities. While the comparison between the two evaluation processes shows how the choice of different indicators in the two cases has led to a different evaluation of even the same researchers.

1. Introduction

In Italy, the culture of research evaluation has struggled to emerge for decades. It was only in 2008 that a national agency was founded with such purpose, namely the National Agency for Evaluation of Universities and Research (ANVUR). While its first major task was assessing the quality of Italian public research, through VQR (*Valutazione della Qualità della ricerca*) 2004-2010, the agency subsequently extended its role to set evaluation criteria for different aspects of academic activity, ranging from the performances of individual researchers who apply for scientific qualifications (Abilitazione Scientifica Nazionale, ASN), to research funding, PhD programs, etc. In contrast with international recommendations (Dora, 2012), (Hatch and Schmidt, 2020), (Mustajoki et al., 2021) the introduced evaluation and selection system – in particular for bibliometric fields of research – massively adopts algorithmic procedures, foreseeing the standardization of individual scientific production to average values of very few parameters. The choice of parameters, as well as their effectiveness in capturing the quality and variety of candidates and research fields, has yet to be adequately verified.
In particular, in this paper we discuss the results of a gender analysis (Montorsi, 2019) on the criteria adopted for VQR 2004-2010, which were used to assign funding to university departments in the subsequent years. We also perform a similar analysis on the criteria adopted for the ASN qualifications of researchers in the period 2012-2013, which were mandatory to be upgraded as professors in 2014-2018. The comparison of the gender performances obtained in bibliometric research areas in the two different evaluation processes shows how the choice of criteria may lead to

quite different results. A crucial observation, since repeated application of the same criteria with even small gender differences can lead to strong biases over time (Addis, 2008). While it would be helpful to perform a similar analysis on the data for the subsequent VQR (2011-2014) and ASN (2016-2018), it is recommended that the disparities in career progression introduced so far by the adopted evaluation system are adequately addressed and eliminated.

2. Brief guide to gender biases in research evaluation

There is an extensive literature on gender aspects of research evaluation (see for instance (Montorsi, 2019), (Addis, 2008), (Xie and Shaumann, 2005), (Symmonds et al., 2006), (Duch et al. 2012), (Huang et al. 2020), (Budrikis, 2020) and citations therein), especially since verification of curriculum by algorithmic bibliometric criteria has become an accompanying practice in recruitment and career progression. Even seemingly non- discriminatory criteria can be unfavorable to one gender once applied. When this happens, it enlightens different attitudes of work for that particular criterion. The typical case is the average number of publications per researcher: the literature agrees in showing a significant difference in favor of the male gender (Symmonds et al., 2006) (Larivier et al., 2013). The difference halves, but still remains significant, in case of the average number of citations (Larivier et al., 2013) (Budrikis, 2020), although the latter is not independent of the number of publications. Finally, the difference appears to be moderately in favor of the female gender when considering the ratio between the number of quality publications and the total number of publications (Symmonds, 2006). Therefore, evaluating the performances of a researcher on the basis of the above criteria, as for instance is done in the ASN qualifications in Italy, is at risk of introducing systematic disparities in favor of male gender in career progressions. The problem should be more contained if only best products are evaluated, as the VQR did. In both cases, however, other obvious non-neutral aspects can characterize evaluation criteria, for instance the choice to use them in an intensive way, measuring performance over a fixed period of time. In this case, it is not only the different use of working time that becomes relevant, but also the possible presence of extra-work commitments (typically family care) during the period, which on average affects differently the two genders. For example, at European level the ERC council has already adopted a few years ago a significant adjustment of the period of time considered to evaluate the researcher in case maternity leaves are taken along it: each maternity is equated to a career break of 18 months, at variance with the 5 months considered in case of ASN and VQR. The overall criticality in this type of evaluation choices lies in the fact that a definite correlation between the quantity and quality of the scientific production of a researcher has never been proven (Duch et al., 2012). Using these criteria without the parallel verification by competent experts of the value of individual researchers' work creates exclusions that are certainly unfair in individual cases. For the female gender, we will see that the unfairness goes beyond individual cases, taking the form of gender discrimination.

3. Gender analysis of research quality evaluation in VQR

We analysed the evaluations obtained by publications submitted for the VQR 2004-2010 by Universities departments in the bibliometric scientific areas. Out of 14 areas, these are the areas numbered from 1 to 9, and area 13[11]. The departments had to submit a given number of articles published in the period under review for each individual researcher belonging to the structure in the same period. The number was three in the case of faculty members. The publications were chosen by each University to optimize the criteria that ANVUR had made available in advance: on the one hand

[11] The numeration of scientific areas can be found for instance at link https://www.anvur.it/attivita/vqr/vqr-2011-2014/gev

the impact factor of the journals in which the article was published[12], on the other hand the number of citations received by the article[13]. This is not the place to examine thoroughly the problematic aspects of such algorithmic evaluations, and dedicated discussions can be found for instance in (DORA, 2012) (Mustajoki et al., 2021). As a follow up of the discussion of previous section, for sure they are expected to exhibit gender differences, since they insist on quantitative intensive aspects, such as the number of articles or of citations, considered on a fixed period of time. On the other hand, the fact that for each faculty member only a limited number of articles was considered in this case might have mitigated the effects.

Tab. 1 reports the data collected in each bibliometric area, analysed by area (a = 1,...,9,13) and gender (g = f,m). In the first three columns (labeled as "GRAN TOTAL") the total number of evaluated articles N(a), their average score V(a) and its variance Var(a) are reported. In the further 8 columns (labeled as "> 54") we also deepened the analysis for the age group at the end of career (from 54 years). In this latter case the data N(a) and V(a) are shown separately for each academic position: tenure researchers (Ric), associate professors (PA), and full professors (PO).

Tab. 1. Number of expected products N(g,a) and average grade V(g,a) by gender g = F,M and area a = A = 1,...,9,13. The first three columns show the overall data, with their variance Var. The last two columns show N (g, a), V(g,a) for the age group over 54, which is divided by role in columns 4-9. The yellow column highlights the result for full professors over 54 of age, higher for female gender in all areas.

[12] In brief, the impact factor of a journal measures how much, on average, a paper is cited in that journal. Typically within a given subject area (physics, economics, mathematics, etc.), journals with the highest impact factor carry out a thorough peer review process prior to the acceptance of an article for publication, which may involve several experts in the field.

[13] The number of citations of a given article counts how many other research articles have cited that particular article since its publication. It is a measure of its popularity, which may be due to the importance of the results it contains, but is typically affected also by effects unrelated to this, in particular the size of the community working on that specific problem, and more directly the number of authors of the articles. Indeed, it is natural that the authors of a given publication will tend to cite it later: if they are more numerous, they will cite it more.

	GRAN			AGE 54 AND MORE							
	TOTAL			RU		PA		PO		Total	
A	N(a)	V(a)	Var	N(a)	V(a)	N(a)	V(a)	N(a)	V(a)	V(a)	V(a)
1	8.780	0,599	0,25	407	0,006	1.065	0,170	1.752	0,616	3.252	0,384
F	2.984	0,518	0,27	252	0,008	504	0,222	357	0,646	1.129	0,301
M	5.796	0,641	0,23	155	0,028	561	0,124	1.395	0,608	2.123	0,429
2	6.121	0,819	0,13	338	0,407	998	0,626	1.362	0,882	2.704	0,725
F	1.166	0,778	0,15	108	0,354	186	0,603	120	0,914	414	0,628
M	4.955	0,829	0,12	230	0,432	812	0,632	1.242	0,879	2.290	0,743
3	7.909	0,797	0,12	288	0,533	1.017	0,621	1.485	0,840	2.802	0,726
F	3.356	0,785	0,12	132	0,499	321	0,655	249	0,885	711	0,704
M	4.553	0,805	0,12	156	0,561	696	0,606	1.236	0,831	2.091	0,734
4	2.922	0,574	0,21	171	0,099	429	0,350	541	0,606	1.146	0,434
F	800	0,571	0,21	60	0,071	147	0,393	97	0,668	307	0,416
M	2.122	0,576	0,21	111	0,114	282	0,327	444	0,593	839	0,441
5	13.134	0,614	0,21	1.042	0,300	1.731	0,460	2.761	0,669	5.573	0,530
F	6.633	0,596	0,22	677	0,334	903	0,481	810	0,694	2.417	0,505
M	6.501	0,632	0,21	365	0,236	828	0,437	1.951	0,659	3.156	0,549
6	27.654	0,466	0,30	4.773	0,127	5.143	0,423	5.263	0,644	15.284	0,403
F	7.872	0,464	0,29	1.666	0,197	1.100	0,480	626	0,689	3.416	0,377
M	19.782	0,467	0,31	3.107	0,089	4.043	0,407	4.637	0,637	11.868	0,411
7	8.259	0,587	0,22	397	0,208	678	0,412	1.572	0,584	2.650	0,483
F	2.881	0,608	0,22	163	0,303	240	0,503	252	0,700	655	0,529
M	5.378	0,576	0,22	234	0,142	438	0,363	1.320	0,561	1.995	0,468
8	9.430	0,536	0,18	589	0,122	1.322	0,356	2.122	0,577	4.048	0,437
F	2.530	0,546	0,15	146	0,177	261	0,483	321	0,587	731	0,468
M	6.900	0,532	0,19	443	0,103	1.061	0,324	1.801	0,576	3.317	0,430
9	13.577	0,726	0,17	255	0,225	949	0,387	2.711	0,672	3.936	0,571
F	1.899	0,761	0,14	47	0,370	80	0,516	141	0,767	268	0,623
M	11.678	0,720	0,17	208	0,193	869	0,375	2.570	0,667	3.668	0,567
13	12.316	0,321	0,21	314	0,150	777	0,050	2.355	0,271	3.489	0,180
F	4.073	0,305	0,20	153	0,122	211	0,127	452	0,337	828	0,193
M	8.243	0,328	0,22	161	0,178	566	0,021	1.903	0,255	2.661	0,177
T	153.885	0,570	0,22	11.868	0,175	19.741	0,423	32.302	0,634	64.427	0,479

A first information can be gained from the second column, comparing the average score V(g, a) in each area for men and women: these are generally close, in a way which differs in the different areas, though the score is higher for men in 7 areas out of 10. Starting from the data in the table, some further information can be extracted. For example we can calculate for each area the relative deviation from the average score for each gender, defined as: $D(g, a) = V(g, a)/V(a) - 1$, with V(g,a) average score for articles presented by gender g in area a. The parameter D(g,a) ranges for females from -19

percent in case of math, to +6 percent in case of engineering. To get a general idea, we can further introduce the parameter D(g), which estimates the overall deviation by gender. It is obtained by summing over all bibliometric areas D(g, a) weighted with the percentage of products of that gender in the area, namely N (g, a)/N (g), with N (g, a) number of products submitted by researchers of gender g in area a. Explicitly:

$$D(g) = \frac{1}{N(g)} \sum_{a} D(g,a) N(g,a)$$

From the data reported in tab. 1 one gets: D(f) = 0.98, and D(m) = 1.01. In this way one can estimate the average disadvantage of female with respect to men as

$$\Delta_{VQR} = \frac{D(m) - D(f)}{D(f)} \approx 3\% ,$$

Which tells us that, when averaged over all areas, the male score is about 3 per cent higher than the female one. This difference could be probably further reduced if maternity leaves were properly counted. It would be interesting to evaluate the results considering maternity leaves equivalent to 18 months career breaks, as for instance is already done in case of ERC.

The minimal difference should not be misleading, since results are not uniform across areas: the areas in which females have better scores are those in which professional activity outside the university context is more practiced, generally by the male gender. Beyond the presence of maternity leaves, the difference may be rooted as well in the weight that citations have in the algorithmic evaluation of products. It would be interesting to do the same evaluation just based on the impact factors of the publications.

Most interestingly, when the result is disaggregated across different cohorts, such as age and academic role, the differences not only disappears, but appears in the opposite direction. In fact it is known (Anfossi, 2016), (Jappelli et al., 2017) that these factors, in particular academic role, are correlated to the average score V (a) of articles: since its value increases as the role increases, a higher percentage of male full professors increases the overall male evaluation. Building on these considerations, in the last columns of the table (labeled with “AGE 54 AND OVER”) the data are unbundled on role and faculty age group simultaneously. In this case the situation tilts in favor of the female gender. The effect amplifies at the end of career (age range greater than 54 years). For instance, as highlighted in the table in the corresponding column, in case of women full professors the increase is present in all areas, ranging from +32 percent for area 13 to +2 percent for area 9. The gap is even greater for associate professors, reaching its maximum in area 13. To quantify it, we re-evaluated the parameter defined in (1) solely for the age range of 54 years and over, obtaining for Δ_{VQR} a difference of 11 percent in favor of female full professors and 33 percent in favor of female associate professors. The result is indicative of a consistent vertical gender segregation: in each role, a more selected set of women compares with a less selected set of men, obtaining better evaluations. As a counterproof, from the number of products N(a) reported for each role in the table, we can infer their gender composition. In this way, we can estimate that approximately thirty percent of female have reached the position of full professor at the end of their career, to be compared to fifty five percent of men. Thus comparing the scores of male versus women full professors means comparing less than one third of selected women with more than one half of the men: it is not surprising that the average evaluation of the former is 11 per cent higher than that of the latter. Similarly, the average score of the second third of women, which are associate professors, is 33 percent higher than that of the third quarter of men in the same position. The result clearly reflects the presence of gender discrimination towards women in career progression. As is confirmed by comparing the data in the fourth and tenth columns, which refer to women and men still in the role of researcher (the starting level) at the end of their career. For the considered research areas, one third of women of 54 years and older have not made any career progression in their working life, to be compared with just 15 percent of men.

4. Gender Analysis of ASN 2012-13 medians for qualifications

Given the vertical segregation enlighten by previous analysis, one might have expected that the subsequent ASN qualifications, which introduced mandatory thresholds for career progression, would have qualified a higher percentage of women. Things turned out differently. In fact, the ASN thresholds made use of different algorithmic evaluation criteria with respect to VQR, more marked by quantitative and intensive aspects. As anticipated, these are more unfavorable to women (Montorsi, 2019), (Filandri and Pasqua, 2020). First of all, the reference to journal impact factors, which for a given research field also witnesses the presence of a peer review pre-processing of the quality of an article, has disappeared. In ASN criteria, this was replaced by the flat total number of publications over a fixed period of time, for which the literature agrees in recognizing a substantial disadvantage for women. More specifically, candidates applying for qualification to a given position —namely associate or full professor— should:

c_1) have a number of publications over a fixed period of time greater than the median number of publications on the same period of researcher already in that position[14] .

Similar requirements apply to two other criteria, both referring to the number of citations of each candidate, counted differently but not independently. Explicitly:

c2) the total number of citations to articles published by the candidate in a fixed period of time must be at least equal to the median number of citations for researcher already in that position;

c3) the number N_X of articles published in a given period of time which have received at least N_X citations must be equal or larger than the median number $\overline{N}_X$ for researcher already in that position.

The above three criteria considered a period of time which was different for qualification to associate and full professors respectively. The actual threshold for qualification consisted in passing at least two of the three above median based criteria.

In order to verify the presence of gender effect on the three criteria, we evaluated for each of them the medians by gender, $M_c(g,s)$, s indicating the disciplinary subfield. A methodological premise is necessary: while in previous section we did show the VQR data for ten different macro areas (out of 14), in case of ASN in each research macro area more disciplinary subfields where identified, so that a direct comparison between the two evaluation is not possible.

Our analysis refers to the thresholds for progression to the role of associate professors for ASN 2012-13, in all bibliometric subfields with at least a hundred candidates: for each subfield, we evaluated the three medians separately for each gender. The results are reported in tab. 2 for 25 subfields, grouping about 4000 faculty members, of whom about 30 percent were women.

[14] irrespectively for instance of the number of authors of the publication or their role in it.

Tab. 2. Medians $M_C(g,s)$ for associate professors (PA) , with c_i criterion (i=1,2,3), unbundled by gender g=F,M and disciplinary subarea s=1,..,25 with at least a hundred candidates. The cases where female medians are lower than male medians on all 3 criteria are reported in yellow, those in which they are higher in green.

Discipline		Medians				Male Medians				Female Medians			
SC	SSD	N(s)	M1	M2	M3	N(s)	M1	M2	M3	N(s)	M1	M2	M3
06/C1	MED/18	268	15	7,64	5	248	15	7,91	5	20	16	7,52	4
06/B1	MED/09	263	31	45,36	11,5	219	31	45,04	12	44	28,5	49,28	11
01/B1	INF/01	240	8	7,75	4	170	9	7,66	5	70	7,5	7,81	4
01/A3	MAT/05	235	9	3,96	4	130	10,5	5,11	4	105	8	2,81	3
05/E1	BIO/10	233	19	30,45	9	112	23	35,35	10	121	17	27,34	8
09/H1	ING-INF/05	210	9	8,93	5	176	10,5	8,93	5	34	6,5	9,07	5,5
03/B1	CHIM/03	182	30,5	45,12	10,5	117	34	44,26	11	65	27	49,79	10
03/C1	CHIM/06	169	32	37,86	10	107	34	46,62	11	62	26	28,55	8,5
02/A1	FIS/01	159	56	97,19	17	128	53	98,75	16,5	31	72	92,18	25
05/G1	BIO/14	159	23	37,71	10	83	25	41,21	11	76	21,5	33,47	9,5
06/A2	MED/04	159	25	51,56	12	79	25	57,18	12	80	24,5	42,85	12
02/B1	FIS/01	152	32,5	28,16	8	120	32	28,92	8	32	33,5	18,74	7,5
03/D1	CHIM/08	151	27	27,27	9	66	27,5	29,24	9	85	27	25,46	8
05/D1	BIO/09	151	18	25,56	9	91	20	26,44	9	60	15,5	21,74	7,5
12/A1	IUS/01	151	2	8,00	1	86	2	8,00	1	65	1	8,00	1
09/E3	ING-INF/01	132	21	16,07	6	115	21	16,20	6	17	25	13,92	6
03/A2	CHIM/02	127	33	34,21	10	86	33	34,16	9,5	41	34	37,32	10
06/F1	MED/28	121	9	2,30	4	100	8	2,14	3,5	21	13	2,71	4
01/A2	MAT/03	115	6	0,97	2	66	5	1,14	2	49	7	0,84	2
06/G1	MED/38	113	29	28,76	10	68	32,5	30,66	11	45	25	25,74	9
06/D6	MED/26	108	40,5	51,59	12	86	41,5	49,63	12	22	35	60,43	12
05/H1	BIO/16	104	23	26,38	8	59	23	29,13	8	45	19	17,92	7
02/A2	FIS/02	101	22	34,46	9	93	22	35,35	10	8	20,5	21,78	7,5
06/H1	MED/40	100	20	17,12	8	85	20	13,93	8	15	30	33,17	11
08/B2	ICAR/08	100	9	5,17	4	80	9	5,02	4	20	12	6,03	4
	TOTAL	4003				2770				1233			

Here it can be seen that the differences are more pronounced than in the case of VQR, and more often in disadvantage of the female gender. In particular, we have highlighted in yellow the disciplinary subfields in which the medians are lower for all three criteria for the female gender, and in green the cases in which this happens for the male medians. The latter occur only in two disciplinary subfields, both in the area of medicine, which is peculiar for the type of faculty engagement (full or part time). However, we do not have such information. The overall trend is decidedly to the disadvantage of the female gender. In order to have a more quantitative idea of the difference between the medians of the two genders, we proceed as in previous section. Starting from the medians reported in the table, for each subfield we could introduce for each gender and criteria the relative deviation of its median from the subfield median $M_C(s)$. In fact, since $M_C(s)$ resent of the percentage of individuals for each gender in the specific subfield, a more insightful parameter comes from the difference in between the two

gender medians $M_C(m, s) - M_C(f, s)$. This can be normalized with respect to the median of one of the two genders, e.g $M_C(f,s)$, through the parameter

$$D_c(s) = \frac{M_c(m,s)}{M_c(f,s)} - 1$$

which positive (negative) value quantifies the advantage (disadvantage) for males with respect to females. The result is also graphically shown in Fig. 1 for the 25 subfields of the above table.

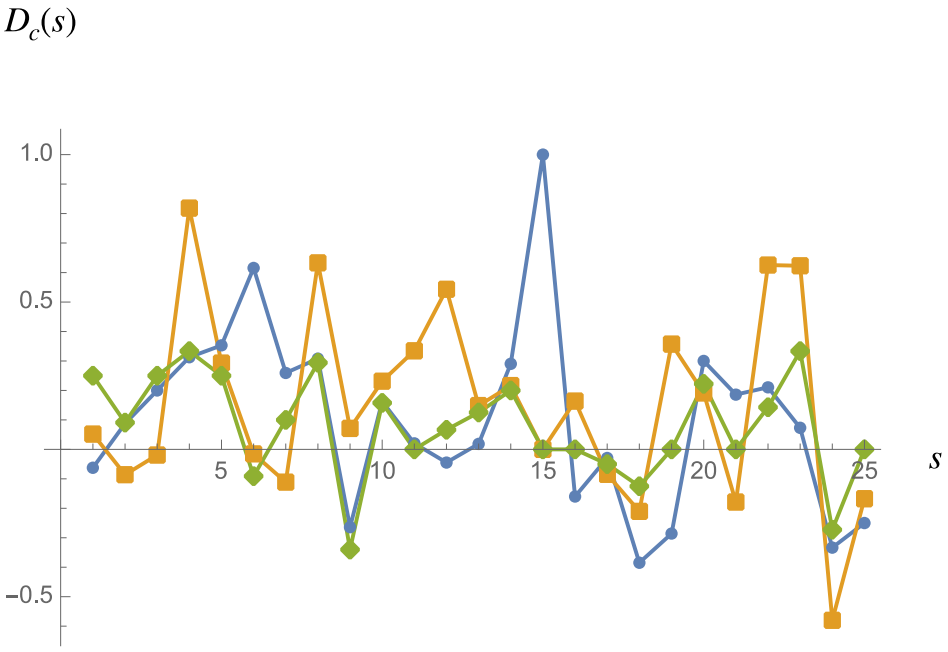


Figure 1: Normalized median difference $D_C(s)$ vs s for each of the subfields of tab. 2, s = 1,...,25, and each of the three criteria: c_1 (related to median number of publications) is represented by blue circles, c_2 (related to median number of citations) as orange squares, and c_3 (related to median number of articles cited at least that number of times) corresponds to green diamonds.

The figure visually returns the size of male advantage for the three criteria across different disciplinary subfields. We quantify this through a global parameter, describing on each of the three medians the global advantage of men with respect to women in the 25 considered disciplinary subfield. Indeed, one could further sum $D_C(s)$ over all s, weighted by the percentage of males in the subfield with respect to the total number of males, N(m,s)/N(m), and define

$$\Delta_c = \frac{1}{N(m)} \sum_s D_c(s) N(m,s) \ .$$

An explicit calculation gives:

Δ_{c_1} = 11,1% , Δc_2 = 13,5% , Δc_3 = 8,7% .

The gender gap on ASN medians is therefore significantly larger than that on VQR evaluations, standing at over 10 percent. The result is certainly even more consistent if read in terms of the number of potential qualified applicants per gender. In fact, assuming that the data follow a Gaussian distribution around their mean value, 2/3 of them will be at a distance from the median that is less than the standard deviation. To get a quantitative idea, this means that for a standard deviation equal to 0,2 (as in case on VQR data), 2/3 of the women would have had results lower than the male medians. Thus we expect that the more the percentage of men is higher in a disciplinary field, the more women will be penalised, since the median of the whole field will be much closer to the male median. To be certain of the actual impact of the observed gender differences of ASN criteria on the qualifications by gender, one could report in the data extraction for each of the disciplinary areas also the percentage of faculty that exceed the indicated medians by gender.

5. Conclusions

We discussed some gender aspects of the criteria used for the VQR 2004-2010 and the ASN 2012-2013 evaluation procedures. In VQR, for each researcher only the best publications were evaluated: the criteria turn out to be overall more neutral with respect to gender, with little systematic advantage in favor of the male gender (of the order of three percent). Fluctuations are more or less significant depending on the areas and probably further reducible if maternity leaves are adequately accounted for, for example as already done at European level. The analysis of VQR results also shows the presence of a consistent vertical segregation. Because of the unrecognized career advancement, at the end of career female professors have an average VQR score in each role significantly higher than males. As a further counter proof, in the disciplinary areas examined, one third of women over 54 years old are still at the starting level (researchers), compared to only 15 percent of men.
In the case of ASNs, the chosen criteria to evaluate the performances of individual researchers where different with respect to VQR, emphasizing more quantitative intensive aspects. In particular, we inspected the gender dimension of the reference medians for associate professors in the 25 bibliometric disciplinary subfields with the highest numbers of candidates. Substantial gender differences are unveiled. For each of the three criteria, the advantage in favor of the male gender is around or above 10 percent. Given the presumable distribution of the data, the difference on the threshold criteria for qualification should have had an even greater impact in terms of qualified candidates by gender. A macroscopic distortion of this magnitude could have been explored in detail by answering the simple question: in each subfield, what was the percentage of women and men exceeding the medians with respect to their total number? The question still needs an answer, which is related to the availability and necessary disclosure of data. This contribution aims to invite an in-depth reflection on the need for a substantial revision of the current mechanisms of evaluation of research and career advancements in public research in Italy. At the same time, after ten years of use of gender biased data, especially in career progression, it has become unavoidable to figure out and implement appropriate mechanisms to rebalance careers, such as "cascading" promotions[15]: the presence of a gender in the next grade should reflect that of the previous grade, with particular attention to 'tenured 'positions at entry level (Picardi, 2019) and to apical levels.

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[15] Presently proposed by the federal Ministry of Education, Science and Research in Austria, see for instance p. 42 at link: https://era.gv.at/public/documents/4228/Austrian ERA Roadmap Final Report June 2020.pdf

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Male and female academic careers at the University of Turin: improvements, persistences and emerging criticalities

Rosy Musumeci

Abstract
The goal of this contribution is to analyse, from a sociological and gender perspective, the scientific careers at the University of Turin (Italy), in the period immediately before the introduction of Gelmini's Law (L. 240/2010) and nowadays. A special focus is placed on the trends regarding the new positions as temporary researchers introduced by Gelmini's Law. The previous position as researcher with open-ended labour contract has been substituted with two new categories of temporary researchers: RTD-A, a 3 up to 5-years labour contract as "junior" researcher without guarantee of being hired as professor at the end of the contract, and RTD-B, a 3-years tenured position as "senior" researcher with a higher income and that (differently from RTD-A) allows the researcher to be hired as associate professor at the end of the contract if he/she has obtained the National Academic Qualification (ASN). What are the scientific fields and the departments where the horizontal and vertical segregation are evident? Does the transformation of the academic position as researcher from a permanent labour contract (before the Gelmini's Law) to a temporary one (after the Gelmini's Law) penalize or not the female scientists? If yes, especially in what scientific fields and departments? Studies show that women are more exposed than men to non-tenured positions (Glazer-Raymo, 2008). Is this also the case of the University of Turin? Are women underrepresented in the new more guaranteed RTD-B positions? Are there any differences in the temporal articulation (for example, in the time spent in each position) of female and male careers? Secondary quantitative data from database of MIUR (Italian Ministry for Education, University and Research), from University of Turin website and data provided by the personnel office of the University of Turin are analysed.

1. Introduction

The international literature describes academia and the world of research as gendered contexts, that is, characterized internally by gender imbalances and asymmetries in the careers of men and women both in terms of the possibility and opportunity to reach the top positions (*vertical segregation*) both in terms of access to certain disciplinary sectors (such as the so-called STEM disciplines) (*horizontal segregation*).
In Europe (28 countries), the percentage of women in a position equivalent to that of full professor is on average around 26,2%; regarding decision-making bodies and leadership, the proportion of women as heads of institutions in the higher education sector stood at 23,6%, 31,1% board members and 24,5% board leaders were women (EC, 2021). Behind these average values there are quite marked differences between countries: the percentage of female professors in grade A ranges from 13% (in Cyprus) to 51% (in Romania), that of women on boards, members, and leaders ranges from 14% to 54% (ibidem).
A plurality of theories attempt to explain at the *micro, meso* or *macro* levels why women continue to be underrepresented in high-grade jobs and in decision-making arenas, in the labour market including academia. This variety reflects the multidimensionality and intersectionality (Crenshaw, 1989) of the gender imbalances in academia and research. At the *micro* level, some contributions attribute the "causes" of this under-representation to the individuals' characteristics, to their level and type of human capital or to their lack of motivation, ambition and even self-esteem (Polachek, 1981); some studies on the *supply-side* focus on gender differences in research productivity (Abramo et al., 2009; D'Amico et al., 2011; Van Arensbergen et al., 2012), some other on the *demand-side* outline the

gender biases influencing the evaluation, recruitment and hiring processes in academia (Bagues et al., 2017). Contributions at the *meso* level analyse the role played by cultures and practices within working organizations (Powell and Graves, 2003; Cress and Hart, 2009; De Paola and Scoppa, 2015; Van den Brink and Benschop, 2014). A third group of theories calls into question the *macro* contexts where individuals and organizations are inserted; in this sense, scholars analyse the role of the welfare regimes – namely the how and how much institutions such as the labour market, family and state, with its policies (including those of care-work reconciliation) – interacting with each other, produce and redistribute different types of resources and therefore structure and reproduce gender inequalities in the life course of men and women (Mayer and Muller, 1986). In the same group we find contributions that reflect on the gender consequences of the reforms of the academic systems (Riegraf et al., 2010; Ferree and Zippel, 2015; Murgia and Poggio, 2018).

This paper offers a contribution to the debate on gender imbalances in academic careers in Italy, focusing in particular on the case of the University of Turin (from now UniTo). It presents part of the results of a research project carried out in collaboration with the Guarantee Committee ("Comitato Unico di Garanzia") of the University of Turin and CIRSDe ("Centro Interdisciplinare di Ricerche e Studi delle Donne e di Genere") with the aim of mapping the careers of academics and technical-administrative staff from a gender perspective. The data come from the university offices and are integrated, in some cases, with those of the MIUR online database and information from UniTo website.

The paper reports and discusses descriptive analyses on the gender composition, and its evolution over time, of the following categories: full professors, associate professors, pre-reform researchers (RU), RTD-A and RTD-B researchers, research fellows, PhD, students of the degree courses of I and II level, and people who hold top positions in the governance of the university. The time period considered is the decade from 2009 onwards.

The questions addressed are the following.

What are the scientific fields and the departments where the *horizontal* and *vertical segregation*[16] are most evident?

Studies show that women are more exposed than men to non-tenured positions (Glazer-Raymo, 2008). Is this also the case of UniTo? Are women underrepresented in the more guaranteed RTD positions (i.e. RTD-B) introduced by the Gelmini's Law? If yes, especially in what scientific fields and departments? Which differences can we observe in the gender composition of scientific careers in UniTo before and after Gelmini's Law?

Are there any differences in the temporal articulation (for example, in the time spent in each position) of female and male careers?

The article is structured as follows: the following section present briefly the Italian context. The third section describes data and methods. The sections 4-6 report the results of the analysis.

2. The Italian context

In Italy the employment rate of women increased in the observed period (+4,1 percentage points) but continues to be lower in cross-country comparative perspective (in 2019, for the 20-64 age group, 53,8% *vs* 68,2% at EU28-level) and, in comparison to men, (-19,6 p.p. compared to the male rate) (Istat[17] and Eurostat[18]). In Italy, the women earn less also. This situation is not due to a weak human capital of the women in comparison to men since among the graduates they are the majority (57,6%[19]).

[16] The first concept refers to the difficulty of women in obtaining upper-level positions in a hierarchy/career (in academic career the full professorship e.g.); the second refers to the exclusion or scarce presence of the women in certain sectors or professions, even in the lower-level positions of a career (like in the STEM disciplines) (Bettio and Verashchagina, 2009).

[17] http://dati.istat.it/Index.aspx?DataSetCode=DCCV_TAXOCCU1#

[18] https://ec.europa.eu/eurostat/databrowser/view/t2020_10/default/table?lang=en

[19] http://ustat.miur.it/dati/didattica/italia/atenei

Moving from the overall labour market to the specific academic world, the female situation in Italy is the following. At the 31/12/2019 women working in public or private universities as professors or researchers are 21.250 representing the 38,4% of the total (55.383). Among the professors in grade A, women are 24,8% and represent the 15% of all the women working at the university as (full or associate) professors and (permanent or temporary) researchers. The distribution of pre-reform permanent researchers (RU) and postdoctoral researchers ("*assegnisti di ricerca*") is gender equal, being in the first case the female proportion in 2019 49,5% and in the second one 50,1%. Regarding the non-teaching staff, women are the majority of the workers in the administrative staff (especially temporary) and among the linguistic collaborators.

Tab. 1. Women in Italian academia at a glance, 2019.

	Total	***Women***	***Female %***
Full professors	13.687	3.395	24,8
Associate professors	22.282	8.747	39,3
Permanent researchers (pre-reform "*RU*")	10.701	5.301	49,5
Temporary researchers ("*RTD-L. Gelmini*")	8.713	3.807	43,7
Adjunct professors ("*docenti a contratto*")*	27.759	10.702	38,6
Postdoctoral researchers ("*assegnisti/e di ricerca*")*	14.105	7.071	50,1
Non-teaching staff			
Linguistic collaborators ("*collaboratori linguistici*")*	1.627	1.250	76,8
Permanent administrative staff*	52.404	30.864	58,9
Temporary administrative staff*	2.172	1.392	64,1

Source: our calculation on: for 2018 http://ustat.miur.it/dati/didattica/italia/atenei, for 2019 http://cercauniversita.cineca.it/php5/docenti/cerca.php
Note: for * data refers to 2018

3. Data and methods

The data analysed in this paper have been provided by the personnel office of UniTo[20] and integrated with data retrieved from the online database of MIUR (Italian Ministry for Education, University and Research)[21] and of UniTo website within the research project "Il monitoraggio delle carriere presso l'Università degli Studi di Torino in una prospettiva di genere: uno studio quali-quantitativo" [22] carried out as part of the activities of the Guarantee Committee ("Comitato Unico di Garanzia") of the University of Turin and of the CIRSDe ("Centro Interdisciplinare di Ricerche e Studi delle Donne e di Genere").
They regard the gender composition (and its trends) of: full professors, associate professors, pre-reform researchers, RTD-A and RTD-B researchers, research fellows, PhD, students of the degree courses of I and II level, and people in decision-making roles and top positions in the governance of the university. They are mainly data on the people employed (i.e. stock) in such positions each year, dates of *hire*, and for full professors also data on *recruited* people. The data were analysed using descriptive statistics. The time period considered is the decade since the introduction of Gelmini's Law (from 2009 onwards).

4. Vertical and horizontal segregation

[20] "Staff Gestione Dati, Indicatori e Procedure, Direzione Didattica e Servizi agli Studenti, dalla Direzione Ricerca e Terza Missione, Area Ricerca Sezione Dottorati di Ricerca, e dall'Area Gestione del Personale" of the University of Turin.
[21] http://cercauniversita.cineca.it/php5/docenti/cerca.php
[22]Post-doctoral research fellowship ("assegno di ricerca"), supervisor: Prof. Chiara Ghislieri, Department of Psychology, University of Turin, president of the Guarantee Committee ("Comitato Unico di Garanzia") of the University of Turin.

The University of Turin is one of the largest universities of north-west Italy, with 73.297 students (60,8% women, 39,2% men) in the academic year 2017/2018, 1.814 administrative staff and 1.882 professors and researchers[23]. It offers over 150 undergraduate and graduate degree programs in almost every field of study and almost 30 doctoral programs, and it is organized in 27 departments divided in 4 study areas: Natural sciences and technology, Life sciences and Medicine, Economic, Juridical and Social Sciences, and Art and Humanities.
The percentage of women in the two main decision-making bodies of the university i.e. the Academic Senate ("Senato Accademico") and the Board of Governors ("Consiglio di Amministrazione"), has increased in the last years, moving from 10% in 2005 to roughly 35% in 2015. To date, UniTo has a male Rector and a female Pro-Rector, but among the 8 vice-Rectors, we find only 1 woman, and the departments led by women are 6/27 (that is 22%) in great part in the life sciences and medical area[24].
At the 31/12/2019, the majority of the academic staff (2.012 researchers, associate and full professors) are men (57,1%), the 42,9% (865) women. If this figure seems not so far from a situation of gender balance ("only" about 7 p.p. from 50%), a different picture arises analysing the data by gender and rank. As the scissors-diagram in figure 1 shows, in 2019 women are the majority (53,7%) among the permanent pre-reform assistant professors (RU). The female presence decreases in the upper level positions of associate professors (-9,8 p.p.), and even more among the temporary assistant professors (so-called RTD) introduced by the Gelmini's Law (-10,7%). The gender gap is maximum for grade A (full professorship) where the women are only 29,0% of the total number (462), that is -42 p.p. compared to the male share (figure 1).

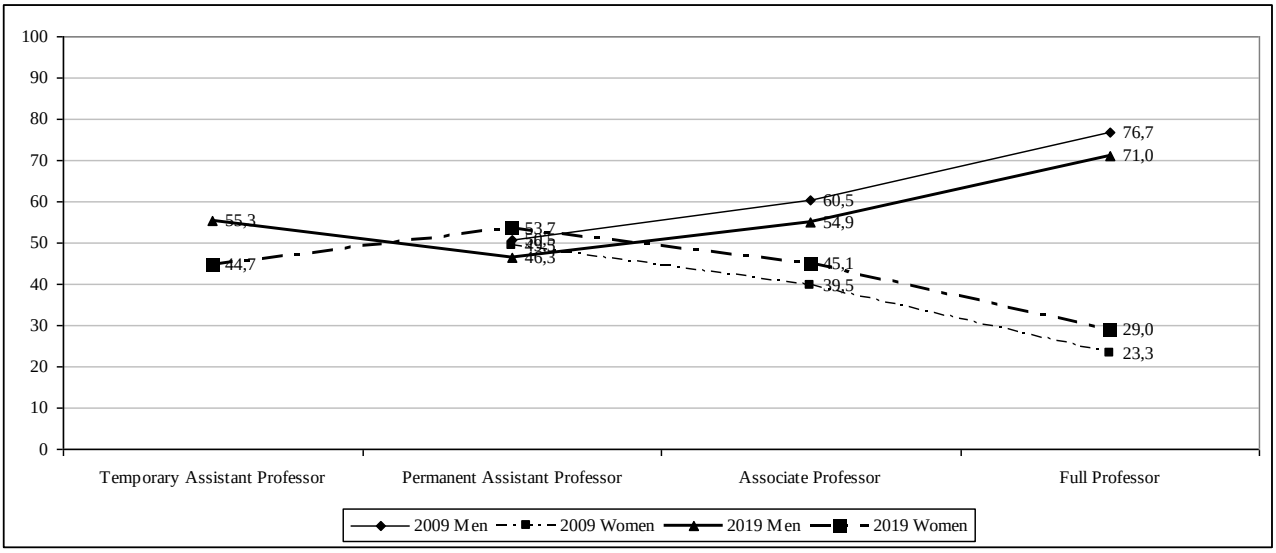


Figure 1. The gender scissor in UniTo, 2009 and 2019, male and female %.

Source: our calculation on https://cercauniversita.cineca.it/php5/docenti/cerca.php and data of personnel office of UniTo.
Note: no data available on temporary assistant professors (RTD) for 2009 because the Law no. 240 (so called L. Gelmini) that introduced these professional figures in academia came into force in Italy in 2010.

Compared to the national average, the female presence in the top positions is higher in UniTo: in grade A (full professors) +4,2% in grade B (associate professors) +5,8% (tab. 1).

[23] At the time of writing, the total academic staff at UniTo is 2,050 with an increase of near +9% compared to 2017. The new recruitments occurred in the last years reversed a bit the declining trend of the previous decade (in 2017 the total number of academic staff was -14% than in 2007 when it was 2,185).
[24] Source: author's elaboration on information enclosed here: https://www.unito.it/ateneo/strutture-e-sedi/strutture/dipartimenti

Regarding the trend in the last decade, in 2019 in comparison to 2009 (one year before the Gelmini's reform) in UniTo the share of women has grown up in all the grades but little – the trend of the lines is substantially flat – ranging from a maximum of +5,7 p.p. with respect to grade A full professor, to an increasing of +2,3 p.p. with respect to the temporary assistant professors (RTD) in 2019 in comparison to 2012, the year of the first recruitments of RTDs in UniTo (figure 2). Therefore, the male and the female curves come closer and the gender scissors narrows between 2009 and 2019 (figure 2).

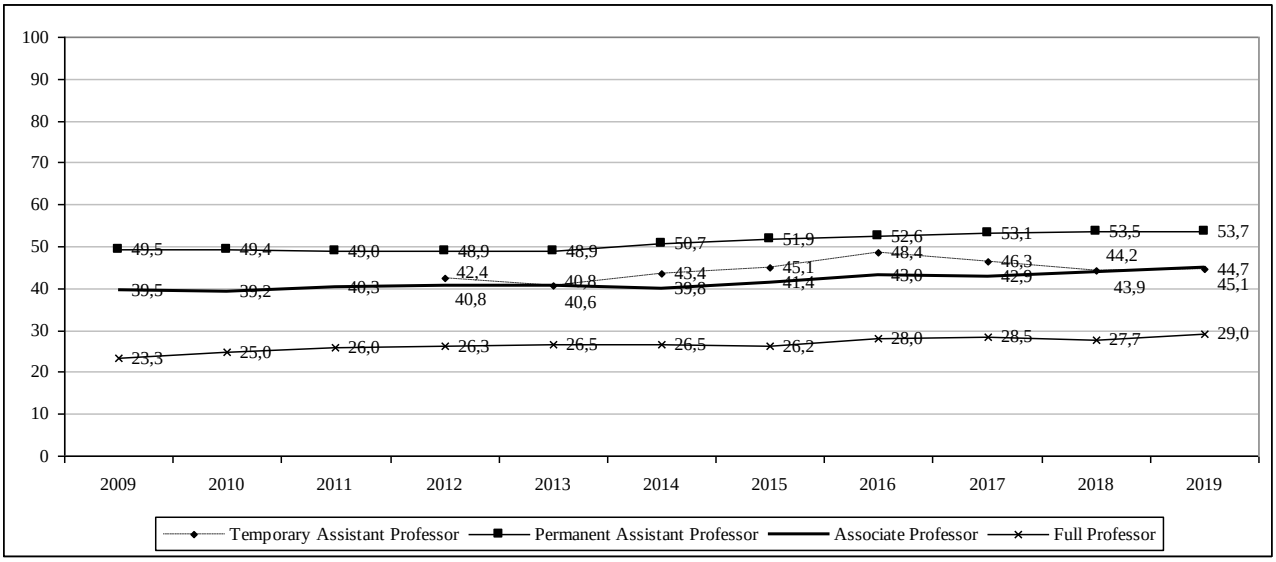


Figure 2. The equality trend in UniTo, 2009-2019, female %.

Source: our calculation on data provided by UniTo personnel office; for 2019: https://cercauniversita.cineca.it/php5/docenti/cerca.php
Notes: Data on temporary assistant professors are available only since 2012 onward because the Law no. 240 (Gelmini L.) that introduced these professional figures in academia came into force in Italy in 2010.

In the decade 2009-2019, the total number of female academic staff (that is permanent and temporary assistant researchers, associate and full professors) increased (although not much, +4,1), while that of male academic staff decreased in major measure (-11,4%).
The number of pre-reform researchers (RU) has undergone a drastic reduction for women (-55,4%) and especially for men (-62,5%) (tab. 2). This is in large part due to the fact that the Gelmini's Law has cancelled this position and substituted it with temporary researchers (RTD) and to the consistent investment that UniTo in recent years has made on the career advancements of the pre-reform researchers. In fact, in the decade the overall number of associate professors increased for men (+30,1%) and women (+64,0%).

Tab. 2. Variation in the number of academic staff by gender and rank (A.V. and %) 2009, 2019, UniTo.

	Men			***Women***		
	2009	*2019*	*Var % 2009-2019*	*2009*	*2019*	*Var % 2009-2019*
Pre-reform assistant professor	461	173	*-62,5*	451	201	*-55,4*
Associate professor	362	471	*+30,1*	236	387	*+64,0*
Full professor	472	328	*-30,5*	143	134	*-6,3*

Source: our calculation on https://cercauniversita.cineca.it/php5/docenti/cerca.php and data of personnel office of UniTo.

Instead, the number of full professors registered a decline in 2019 in comparison to 2009 probably due to the retirements only minimally replaced by the recruitment of new staff and career advancements. The decline is especially strong for men (-30,5%) probably because they are overrepresented in the older cohorts. This data seems suggests that the increased female share among full professors (as said, +5,7 p.p. in the decade 2009-2019) is due mainly to the decreasing of the number of men in this group because of retirement, not for a major recruitment of women as full professors. *Women recruited as full professors continue to be the minority*: since the implementation of Gelmini's Law (2012) until 31/12/2019, only 31,5% (less than 1/3) of the 213 public competitions for full professors held by UniTo had a female winner[25].
What are the departments and scientific fields where the *vertical segregation* is most evident?
In 2017 only in the department of "Foreign languages, literatures and modern cultures" the great part of full professors are women (58,3%), in all the other 26 departments the great part of full professors are men. However, there is variety in the gradation of low female presence in the higher rank of the academic career between groups of departments. The departments with the worse performance in terms of low female presence among full professors (no higher than 20%) are six; they are in great part STEM or medical departments, but there is also a SSH department where sociology is a leading field (figure 3).

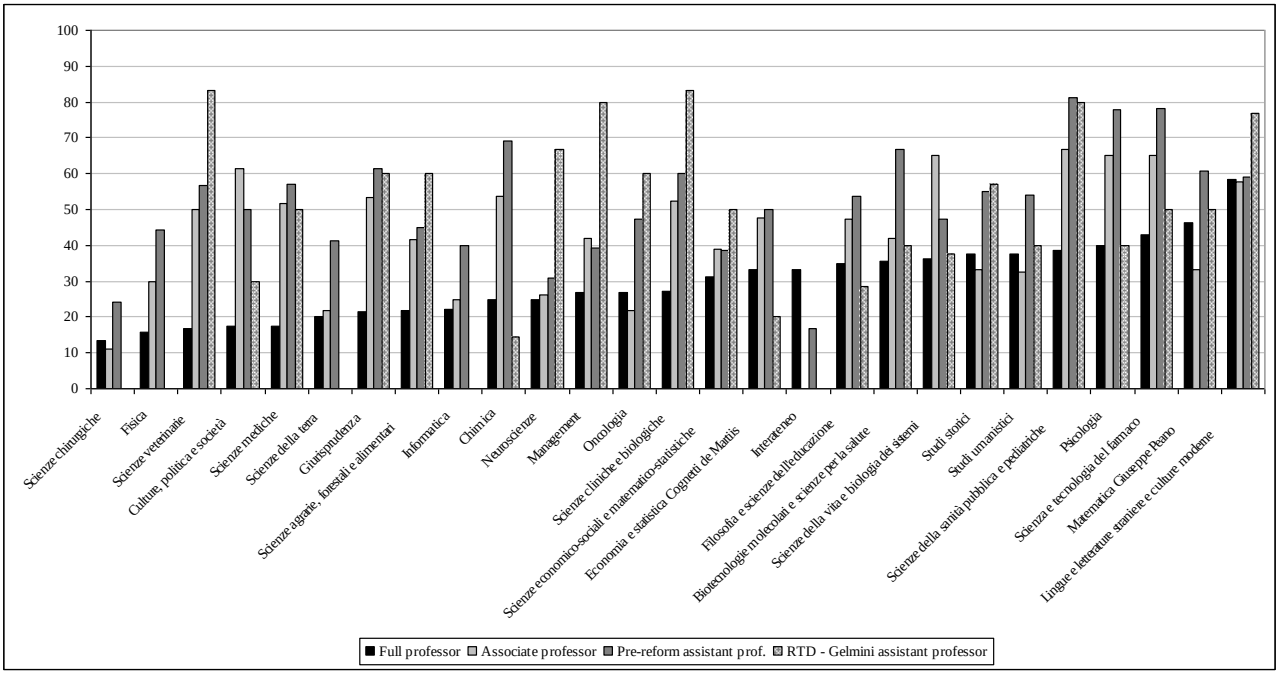


Figure 3. Female % by rank and department, 2017, UniTo.

Source: our calculation on data provided by the personnel office of UniTo.
Note: The departments are sorted (from left to right) from the one with the highest share of women among full professors to the one with the lowest share.

In 11 departments, the female proportion among full professors ranges from 20% and 1/3. They are in great part departments in the area of Life sciences and Medicine, Natural sciences and technology, but also in Economic and Juridical sciences.
Regarding STEM disciplines, the department of Mathematics looks a "virtuous case" from a gender equality point of view with 46,2% of women in full professorship (the highest share after the

[25] *Source*: Our elaboration on the minutes of the public competitions. Art. 18, comma 1 L. 240/2010: https://www.unito.it/universita-e-lavoro/opportunita-ed-esperienze-di-lavoro/personale-d-e-r/procedure-selettive-chiamata-prof-I-II-fascia, art. 24, comma 5 and art. 24, comma 6, L. 240/2010: https://www.unito.it/universita-e-lavoro/opportunita-ed-esperienze-di-lavoro/personale-d-e-r/procedure-valutative-chiamata-prof-I-II-fascia

department of "Foreign languages, literatures and modern cultures"), 60,9% of pre-reform assistant professor, and 50% of RTD.
Comparing the female proportion in full professorship and that in assistant professorship, the departments where in 2017 the vertical segregation looks stronger – that is the women are the majority among the researchers but a scarce minority among the full professors - are: "Public Health and Pediatrics", "Chemistry", "Psychology", "Molecular Biotechnology and Health Sciences", "Law", "Clinical and biological sciences", "Medical sciences", "Veterinary sciences", "Historical studies".
These data are partially[26] confirmed by the glass ceiling index (GCI) calculated – according to the definition of *She figures* (EC, 2021) – for each CUN[27] scientific field. The higher the value, the stronger the glass ceiling effect and the more difficult it is for women to move into a higher position. As shown by tab. 3, in UniTo the scientific fields with the higher GCI are in the STEMM disciplines: "Agricultural and veterinary" (1,90), "Chemistry" (1,89), "Medicine" (1,68), "Biology" (1,63) but also in the SSH there are scientific fields with relatively high GCI as "History, philosophy, pedagogy and psychology" (1,52).

Tab. 3. Glass ceiling index (GCI) by scientific field in UniTo, January 2020.

	Scientific field (CUN classification)	GCI	Level of feminization of the scientific field (Female % in grade A, B, C*)	Women in grades A, B, C* (A.V.)
STEMM	1- Mathematics and informatics	1,08	35,9	51
	2- Physics	1,33	25,3	22
	3- Chemistry	1,89	56,8	75
	4- Earth science	..	26,4	14
	5- Biology	1,63	50,5	96
	6- Medicine	1,68	35,9	120
	7- Agricultural and veterinary	1,90	43,3	93
	8- Civil engineering and architecture	0,40	40,0	2
	9- Industrial and information engineering	..	20,0	1
SSH	10- Philological-literary and historical-artistic sciences	1,37	52,3	113
	11- History, philosophy, pedagogy and psychology	1,52	45,9	101
	12- Law	1,41	43,0	65
	13- Economics and statistics	1,43	40,9	67
	14- Political and social sciences	1,26	44,6	41

Source: our calculation on https://cercauniversita.cineca.it/php5/docenti/vis_docenti.php
Note: GCI according to the *She Figures report* (EC, 2021) definition: PW(a+b+c),Y/PW(a),Y.
.. = is impossible to calculate since F in grade A (A.V.) is 0.
*MIUR's definition of grades: A=PO; B=PA; C=RU+RTDb+RTDa; D=post-doc

In UniTo women are the minority both in the STEMM disciplines (40,7%) and in SSH disciplines (46,0%[28]). Among the departments where the *horizontal segregation* is most evident – that is, the women are few since the assistant professorships – there are "Surgical sciences", "Neurosciences", and "Informatics" (figure 3). The female horizontal segregation begins since the enrolment in the degree courses of I and II level. Women are the majority of the students in the great part of the departments (16/27) but the minority in many STEM departments in particular they are very few at the departments of "Informatics", "Physics" and "Earth science" (respectively 12% and 30%, 31%).

5. Not only «glass ceiling» but also a «glass door»?

[26] Partially because departments and scientific fields are not totally overlapped; for example, in a certain department professors and researchers of different scientific fields can be affiliated, like in the case of the department of "Cultures, politics and society".
[27] Consiglio Universitario Nazionale.
[28] Data refer to January 2020.

The national Gelmini's Law (2010) made temporary the position of researcher at the University in Italy while in the past it was an open-ended labour contract; moreover, it introduced the distinction between junior researcher (RTD-A) and senior researcher with 3-years tenure track and higher income compared to RTD-A (RTD-B).
Does the gender distribution in the first phases of scientific careers (from RU to RTD) change with this law? Are there any differences in the gender composition of RTD-A and B? What's the trend since their introduction? Studies show that women are more exposed than men to non-tenured positions (Glazer-Raymo, 2008). Is this also the case of the University of Turin? Are women underrepresented in the new, more guaranteed RTD-B positions? What are the differences between scientific fields and departments?
What we can see is that there are fewer women among RTD researchers than among RU researchers in UniTo (-9 p.p. in 2019); among RU women are the majority, not the same among RTD (figure 1). Since Gelmini's Law implementation, except for 2016, the great part of RTD-A and especially RTD-B have been men (figure 4).

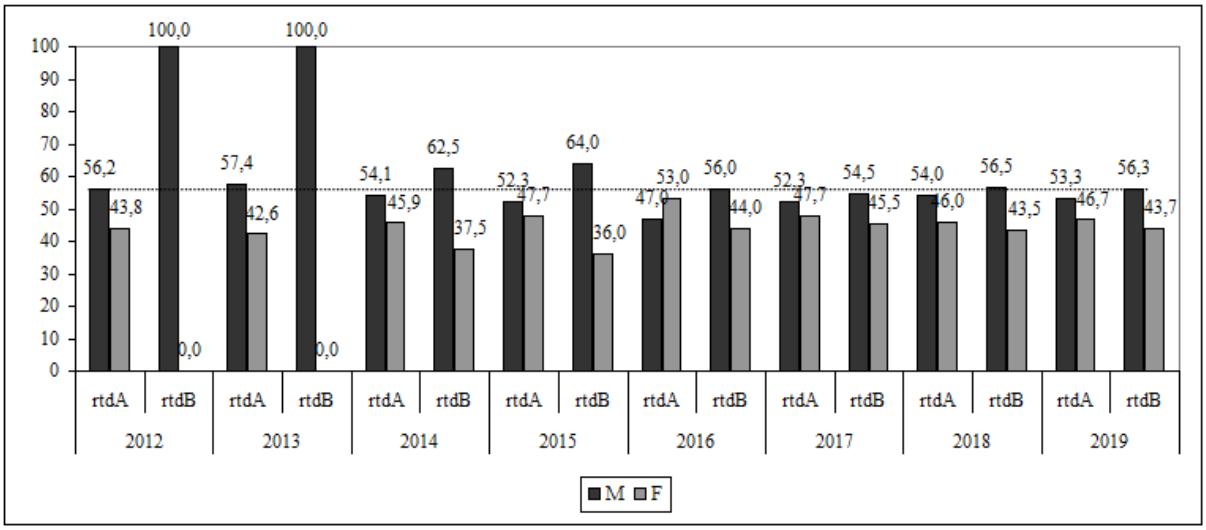


Figure 4. Trend of the gender composition of RTD-A and RTD-B (%) Stock – UniTo.

Source: our calculation on http://cercauniversita.cineca.it/php5/docenti/cerca.php
* In 2010 and 2011 there were no RTD in UniTo

Regarding the tenured positions as RTD-B, in the great part (15) of UniTo departments they are occupied mainly by men, in a minority (6) by women, in 5 departments the gender composition of RTD-B group is equal with about 50% women and 50% men (tab. 4).

Tab. 4. Female % among RTD-A and B, UniTo, February 2019.

	SCIENZE CHIRURGICHE	FISICA	MATEMATICA GIUSEPPE PEANO	SCIENZE DELLA TERRA	SCIENZE ECONOMICO-SOCIALI E MATEMATICO-STATISTICHE	SCIENZE MEDICHE	FILOSOFIA E SCIENZE DELL'EDUCAZIONE	CHIMICA	ONCOLOGIA	INFORMATICA	CULTURE, POLITICA E SOCIETA'	SCIENZA E TECNOLOGIA DEL FARMACO	ECONOMIA E STATISTICA COGNETTI DE MARTIIS	SCIENZE DELLA SANITA' PUBBLICA E PEDIATRICHE	STUDI UMANISTICI	SCIENZE VETERINARIE	SCIENZE DELLA VITA E BIOLOGIA DEI SISTEMI	GIURISPRUDENZA	SCIENZE AGRARIE, FORESTALI E ALIMENTARI	STUDI STORICI	SCIENZE CLINICHE E BIOLOGICHE	PSICOLOGIA	LINGUE E LETTERATURE STRANIERE E CULTURE MODERNE	MANAGEMENT	BIOTECNOLOGIE MOLECOLARI E SCIENZE PER LA SALUTE	NEUROSCIENZE
RTD-A	20,0	0,0	100,0	0,0	66,7	66,7	60,0	0,0	50,0	0,0	28,6	100,0	50,0	75,0	33,3	100,0	66,7	50,0	20,0	0,0	100,0	100,0	100,0	0,0	0,0	60,0
RTD-B	0,0	0,0	20,0	20,0	25,0	28,6	28,6	30,0	33,3	33,3	38,5	40,0	40,0	42,9	45,5	50,0	50,0	50,0	50,0	50,0	62,5	66,7	70,0	75,0	80,0	100,0

Source: our calculation on http://cercauniversita.cineca.it/php5/docenti/cerca.php
Note: no RTD at the "Interateneo"; the departments are sorted (from left to right) from the one with the lowest share of women among RTD-B to the one with the highest share.

Our analysis seems to confirm recent studies (Gaiaschi *et al*., 2018; Picardi, 2019) suggesting that the reforms of the Italian University have increased the "adverse selection" toward women in the initial stages of the academic career, especially in the selections as RTD. Indeed, in the great part of UniTo departments the majority of the students of degree courses, PhDs and post-Doctoral research fellows are women[29]. In particular, most of the research fellows are women in the majority of the 27 departments; those in which women are very much present in this category of temporary workers are the "Interateneo" of sciences, projects and policies of the territory where all the research fellows are women, the department of "Psychology" with 78,6% of female research fellows and that of "Molecular biotechnology and health sciences" with 2/3 (67,2%). In 10/27 departments, most of the research fellows are men.
So why the great part of RTD (especially tenure track positions) – position that opens the so-called "door" of the stable and guaranteed academic career – is male if the starting basin of precarious positions (students, PhDs and post-Doctoral research fellows) is mainly female?

6. Timing

Are there any differences in the time spent by men and women in the various academic positions in UniTo?
Analysing the number of years from hire, at 31/12/2017, on average women spent fewer years (nearly -3 years) in full professorship than men having the same average age (that is 59). This seems to suggest that women reach full professorship after in comparison to the male colleagues. An interpretation that seems reinforced by the fact that women in grade A on average spent a little more time (about one year) in the previous position as associate professor before the advance to the step of full professor. Regarding the associate professors, there are no substantial differences in the time spent in the previous position as pre-reform researchers, so-called RU (9 years on average both for men and women). While if we look at the *stock* of "new" researchers – the so-called RTD – we see that at six years from Gelmini's Law implementation (at 31/12/2018) female RTD researchers are older than their male colleagues. This is evident especially among RTD-A researchers (figure 4).

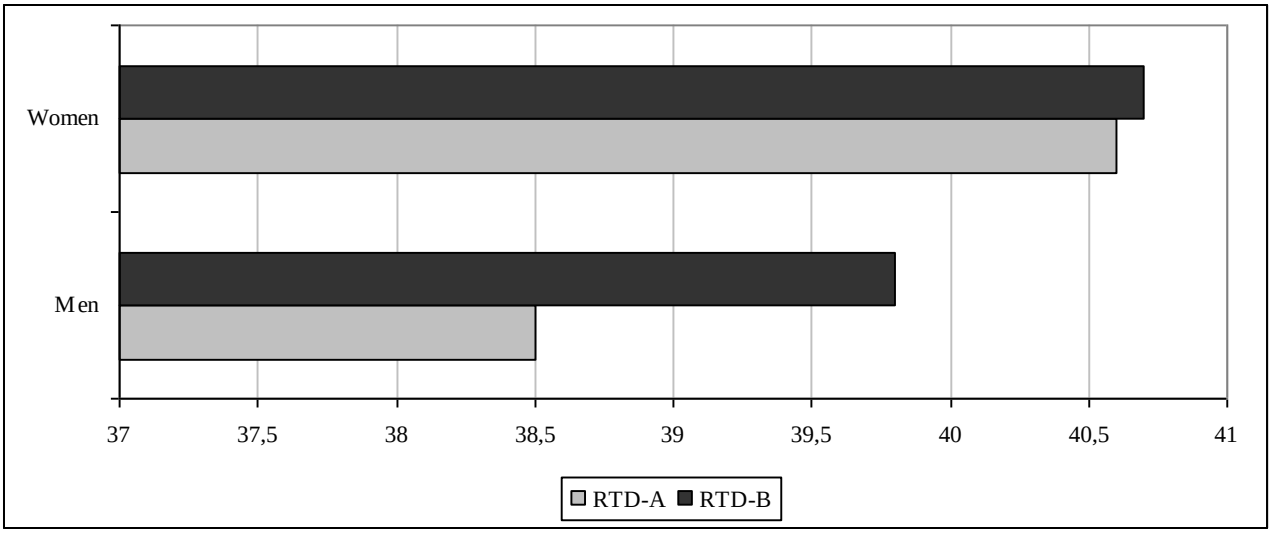


Figure 4. Male and female RTD's average age - 31/12/2018, UniTo.

[29] In 2017 the female percentage is 60,8% among the students, 62,3% among the graduates, 56,4% among the PhD, 58,4% among the post-doctoral research fellows.

This seems to suggest that women reach these positions when they are older in comparison to men, therefore more in-depth analyses are needed to verify this hypothesis and the reasons of this phenomenon.

7. Conclusion

This work has analysed the academic careers of male and female staff at the University of Turin.
The results show (slow) improvements, like for example the (small) reduction of the gender gap for associate and full professors and the female overtaking regarding the pre-reform assistant professors. Despite these, the glass ceiling persists. Women are the majority in the first phases of the academic career – among degree students, PhDs, research fellows and pre-reform researchers – while they are the minority among associate and especially full professors (the 29%) and in the key governance roles (only 6/27 departments have a female head).
The female share among full professors increased in the decade 2009-2019 (+5,7 p.p.) but this seems due mainly to the decreasing number of men in this rank because of retirement, not for a major recruitment of women as full professors. Indeed, women *recruited* as full professors continue to be the minority: since the implementation of Gelmini's Law (2012) only less than 1/3 of the public competitions for full professors held by UniTo had a female winner, more or less the same proportion observed in the 2019 *stock*.
Regarding the first steps of the scientific career, Gelmini's Law seems to increase the gender gap at the entrance of academic career: women are the minority among RTD-A and especially among the tenured track RTD-B in 15/27 departments. This is a trend to be monitored since it could risk slowing down the recent improvements observed in the increasing number of female associate professors (indeed, fewer female RTD-B means also fewer associate professors in a short period).
Some limits of the present work have to be underlined. The descriptive analysis presented here is based mainly (except for full professors) on the data referring to the "stock" of men and women by rank and year. This means that they are affected by demographic dynamics (like for example the over-representation of men entering the academic profession before its feminization). A more precise way to investigate changes in time is to compare "stock" data with "recruitment" data (see for example on the Italian case: Gaiaschi and Musumeci, 2020). For this reason, future developments of this work could be to analyse recruitments data.
Moreover, since there is evidence that women are more adverse to risk, less competitive, have a lower degree of self-confidence and suffer more from receiving negative feedbacks (De Paola and Scoppa 2015; Eckel and Grossman, 2008), for the future another possible development of this work could be a joint analysis of the gender composition both of the participants to the public competitions and of the winners in order to detect any differences between women and men in the probability to participate in the public competitions and to pass them. The method to be used in order to access this information is to analyse the minutes of the public competitions because the Italian universities and the MIUR itself do not officially record and public this information; unfortunately, not always these documents are published on the university websites (at least in full version) and are not simple to obtain[30].
Finally, more precise analysis are needed on the temporal articulation of men and women careers; the data provided by UniTo personnel office on previous position of UniTo academic staff do not include information on the position occupied in other universities, for example.

[30] The minutes of the public competitions held by the University of Turin are published on the institutional website, but they do not include the complete list of all the participants. This list is registered and archived by the Recruitment Office. For this reason, we had asked (on February 2019) the full version of the minutes in order to extract the information on the gender composition of the participants to the public competitions since the implementation of Gelmini's Law (2010). Unfortunately, to date, we have not obtained it.

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A Gender-sensitive Tool to Promote Gender Equality in Academia. The Gender Budget Report

Cristina Quartararo, Elisabetta Ruspini

Abstract
This paper discusses the role of gender budgeting in promoting gender equality in academia and research institutions. The elaboration of tools like the Gender Budget Report (Bilancio di Genere) is a significant starting point to promote gender equality. This empirical tool produces gender-sensitive data and statistics, crucial elements in the process of planning, monitoring and reviewing equal opportunities policies. In the Italian context, the culture of gender budgeting has only recently developed. This paper addresses the specific case of the University of Milano-Bicocca, established in 1998 and located in the Northeast of Milan. The first edition of the University of Milano-Bicocca Gender Budget Report was published in 2018. The document contained data specifically collected and analysed to critically assess the state-of-play of the local academic context − in terms of gender differences and inequalities − and to identify possible solutions to tackle gender imbalances. Gender budgeting is a crucial tool to detect gender bias and to implement policies that are sustainable, equitable and inclusive.

1. Introduction

The growing inclusion of women in academia, among students, academic staff and at the higher ranks of the academic profession, is a relatively recent phenomenon both in Europe (Santiago et al., 2008; European Commission, 2019) and in Italy (ISTAT 2018; Morana and Sagramora, 2020). Findings from the European Commission's 'She Figures 2018' report, the main source of comparable statistics on the level of progress made towards gender equality in research and innovation in Europe, show encouraging signs of improvement. The EU is approaching gender balance among doctoral students: in 2016, women made up 47,9% of EU doctoral graduates, while in two-thirds of EU Member States the proportion of women among doctoral graduates ranged between 45% and 55% (European Commission, 2019, p. 6). In almost all EU countries the proportion of women among grade A academic staff increased slightly between 2013 and 2016 (from 22,1% to 23,7%) and the respective proportion among heads of institutions in the higher education sector increased from 20,1% in 2014 to 21,7% in 2017 (European Commission, 2019, p. 121). She Figures 2021 data (European Commission, 2021, p. 7) confirm such moderate positive trends, with almost gender parity at PhD graduate level and a slight increase in the proportion of women holding the highest academic positions (26,2%).
Despite the growing presence of women, gender biases continue to characterize both the European and the Italian academic systems, where horizontal and vertical segregation phenomena heavily persist. Even though an official 'equality ideology' and a quite broad 'equality policy' are widespread in most European countries, institutionalised gender stereotypes and discrimination against women permeate institutional practices at every level and have negative effects on women's career opportunities (European Commission, 2013). There is evidence that tertiary education degrees of women are undervalued by the labour market (Santiago et al., 2008): even when women have tertiary education, they are more likely than men to be unemployed. Women dominate at the lowest administrative and research ranks and are under-represented in the highest grades and research posts and as heads of academic institutions (European Commission, 2016, 2019, 2021). In the EU-28 in 2016 women represented 46% of grade C academic positions (defined as the first grade or post into

which a newly qualified PhD graduate would normally be recruited), 40% of grade B (associate professors) and 24% of grade A (full professors) academic positions. The gap between women and men was wider in STEM disciplines (Science, Technology, Engineering and Mathematics): while women made up 37% of doctoral students and 39% of doctoral graduates, they held only 15% of grade A academic positions (European Commission, 2019, p. 6). Gender biases also affect hierarchies in decisional-making bodies. According to EUA-European University Association, in 2020, 15% of rectors in EUA member universities (48 countries) are women. Similarly, female vice-rectors are outnumbered by male vice-rectors: on average, nearly 30% of all vice-rector positions are women. The bottlenecks for women seem to be the achievement of full professorship, which is considered as a prerequisite for top-level positions. However, data suggest a tendency for a more balanced gender distribution over the years among both rectors and vice-rectors (EUA, 2020).

Women experience discrimination at different points in their working lives, including during recruitment, hiring, promotion and funding processes, as well as in daily interactions with colleagues and supervisors (Husu, 2001). Negative stereotyping affects mothers in particular: the so-called 'maternal wall' inhibits women's progress, at any stage of their career, once they become mothers (Williams and Segal, 2003; Williams, 2005). The need to find an equilibrium between family and career is mirrored in the predominance of women researchers working part-time: at the EU level, 13% of women researchers and 8% of men researchers were working part-time in 2016. In the EU-28, women are also under-represented in the writing of scientific papers (European Commission, 2019, pp. 6, 7, 96). Not surprisingly, the incidence of women without children among academics is high: according to Mason and Goulden (2002), over 50% of tenured women have no children. Unfortunately, far fewer studies have explored the sharp impact of having children on academic women's careers. With the aim of contributing to the current lively debate on gender inclusiveness and (in)equalities in academia, the present paper will address the specific case-study of the University of Milano-Bicocca.[31] We will discuss the most significant results emerging from the Gender Budget Report (Bilancio di Genere) published in 2018 (University of Milano-Bicocca, 2018). This gender-sensitive tool offers important insights into existing gender inequality/imbalances, procedures and practices to identify gender bias and positive actions needed to promote gender equality in employment and training.

The paper is structured as follows. Using secondary analysis of official statistics (European Commission, ISTAT-National Institute for Statistics, MIUR-Italian Ministry of Education, University and Research), paragraph two gives an account of the current state of inclusion of women in Italian higher education institutions and highlights the role played by the Gender Budget Report as a key tool for gender equality policies. The third paragraph describes the specific case of the University of Milano-Bicocca and both positive and negative trends are taken into account, as well as the implementation of good practices around gender.

2. Women and Gender Inequalities in the Italian Academia

This paragraph briefly discusses the (very partial) inclusion of women in Italian academic institutions.[32] The Italian academia has a hierarchical and bureaucratic structure, marked by the persistence of gendered structures and processes (Colella, Gianturco and Nocenzi, 2017). Although some progress towards a more gender-balanced composition of the academic body has been achieved over the last ten years, also due to substantial modification of recruitment and promotion procedures,

[31] A preliminary version of this paper (*The University of Milano-Bicocca and Gender Equality: What Progress in 2019*?, by Noemi Novello and Elisabetta Ruspini) was presented at the International Conference *Inequality vs Inclusiveness in Changing Academic Governance: Policies, Resistances, Opportunities*, 16-17 September 2019, University of Naples Federico II, Napoli.

[32] For further details please see: Micali, 2001; Frattini and Rossi, 2012; Toscano et al., 2014; Biancheri and Tomio, 2015; Fontana, 2015; Colella, Gianturco and Nocenzi, 2017.

the Italian context remains markedly characterized by strong gender asymmetries and inequalities, already at the early stages of career after PhD graduation (Dubois-Shaik and Fusulier, 2015; Bozzon, Murgia and Villa, 2017; Checchi et al., 2019; Filandri and Pasqua, 2019). The overall situation was not improved by several 'reforms' that took place over the years, whose stated intent was to increase competition, to improve the 'merit' assessment process, to move the Italian academic careers towards a 'tenure track model' and to limit collusive behaviour. Normative changes have instead increased the flexibilization/precarization of the early-stages research positions, introduced in 2005 by the Moratti reform (Law n. 230/2005) and completed in 2010 by the Gelmini reform (Law n. 240/2010)[33], which was passed amid strong protests. The negative impacts of these reforms in terms of gender equality have been largely discussed (Toscano et al., 2014; Bozzon, Murgia and Poggio, 2015; Pautasso, 2015; Gaiaschi, Falcinelli and Semenza, 2018; Coin, Giorgi and Murgia, 2017; Ferri and Murgia, 2017; Bosisio and Sala, 2017). The data provided by the Italian Ministry of Education, University and Research (MIUR) show the strengthening of a gendered selection in the access to the academic profession to the disadvantage of women, after implementation of Law 240/2010 (Picardi, 2019). In addition to this, financial cuts to university and research budgets have generated a reduction of the already limited 'entrance gates' to academic careers, fewer possibilities of long term prospects and higher precarious profiles in academic settings (Armano, Rivetti and Busso, 2017; Bozzon, Murgia and Villa, 2017; Giancola and Toscano, 2017; Picardi, 2019; De Angelis and Grüning, 2020). The available data[34] highlight persistent gender inequality in career advancement for women and a clear vertical segregation[35]: the higher the career position, the lower the presence of women (European Commission, 2016, 2019; Morana and Sagramora, 2020). In Italy (Morana and Sagramora, 2020, p. 6), the proportion of women falls sharply moving from the early career stage to leadership level, namely full professors: in 2018 women made up 50,1% of post-doctoral fellows (grade D), 46,8% of grade C academics, 38,4% of grade B academics (associate professors) and 23,7% of full professors (grade A). Frattini and Rossi (2011) documented that the disadvantage of Italian female academic staff in career advancements has not changed between 2000 to 2011 – both for the transition to associate professorship and to full professorship (Frattini and Rossi, 2012). A recent study (Mazzotta et al., 2019) involving 66 public Universities surveyed in 2017, shows that the boards of directors were still dominated by men, with the only exception of the University of Cagliari. According to the same research, in 2017 only five Universities were headed by a woman rector. Gender imbalances also emerge in the concentration of women in specific activities and/or areas of knowledge (the so-called 'horizontal segregation[36]'). At both national (Avveduto, 2019; Cellini and Saracino, 2013) and European levels, women constitute a minority in STEM disciplines (Science, Technology, Engineering and Mathematics), while being overnumbered in certain academic fields traditionally considered 'typical' of women (HSS-Humanities and Social Sciences). In Italy, the latest available data (referring to 2018) show the low percentage of women (27,4%) enrolled in the Engineering and Technology fields (Morana and Sagramora, 2020).

[33] Law 240/2010 introduced a tenure-track system and eliminated all permanent contracts for academics below the associate professorship (Art. 29, par. 1).

[34] According to Bozzon, Murgia and Poggio (2015: 7), it is not easy to get a complete picture on career trajectories, as well as on gender inequalities in Italian scientific careers, since available data are incomplete and fragmented. The most popular publication offering gender-sensitive statistics is the already mentioned European Commission's 'She Figures' report, based on well-established statistical indicators such as: the presence of women in research across different sector; horizontal and vertical gender segregation across different fields of study and research occupations. As regards the Italian situation, the Ministry of Education, University and Research has set up an online database (starting from 2012) on the employment of scientific and technical personnel in the academic sector (open data section, MIUR web site: http://dati.ustat.miur.it/dataset/dati-per-bilancio-di-genere).

[35] 'Vertical segregation' refers to hierarchical ranks: the proportion of women declines along the academic ladder. The 'glass ceiling' metaphor (Federal Glass Ceiling Commission, 1987) indicates the existence of obstacles that prevent women from gaining apical positions in the occupational pyramid.

[36] 'Horizontal segregation' refers to the massive concentration of women or men in specific fields. In the academic context, the proportion of women declines in STEM fields while men are usually few in female-dominated fields like Educational Sciences or Social Work.

Tackling gender inequalities in academia is not an easy task to accomplish. There is a need to examine how inequalities are produced and sustained (recruiting decisions are often influenced by unconscious gender bias) and to identify effective policy responses (Picardi, 2017; Picardi and Agodi, 2020). Reducing gender inequality in academia requires action on multiple fronts and gender-sensitive data are needed. As written, monitoring of actions taken towards gender equality is a main driving factor for effective implementation of targets and the first essential step consists in the collection of sex-disaggregated statistical data (European Commission, 2018).
The Gender Budget Report is an instrument that, if actively implemented and linked to Positive Action Plans-PAP[37] (Calafà and D'Onghia, 2018; Siboni and Galizzi, 2016; Frazzetta and Rapetti, 2018), may play a significant role in gender mainstreaming. The purpose of the Gender Budget Report is to examine and discuss gender differences and inequalities and to try to identify possible solutions to tackle gender imbalances. This empirical tool produces gender-sensitive[38] data and statistics, crucial elements in the process of planning, monitoring and reviewing policies for equal opportunities (Calafà and D'Onghia, 2018) and to raise awareness around gender issues in academic environments. The description of the context from a gender perspective is essential to perform gender-sensitive research (Decataldo and Ruspini, 2014) and to capture the gender dimensions of social change (Ruspini and Dale, 2002). In Italy, the University of Ferrara was the first one to adopt the Gender Budget Report in 2012. More recently, the Conference of Italian University Rectors (CRUI) recommended the Gender Budget Report as a necessary tool to monitor progress achieved in terms of gender equality. Indeed, the CRUI constituted an *ad hoc* group of experts to elaborate a Common Guideline Framework to Gender Budget Report (CRUI, 2019) to be shared among Universities.

3. The University of Milano-Bicocca

The University of Milano-Bicocca, located in the Northeast of Milan, was established in 1998. Over the last 20 years, the number of students has significantly grown (in its first academic year there were 15.300 students, today they are almost 35.000, of which more than 20.000 are women). The University of Milano-Bicocca is now officially classified as a 'large' University,[39] with a wide range of higher education and training courses.
In 2018 the University of Milano-Bicocca published its first Gender Budget Report, aimed to investigate gender bias, to highlight inequalities that may be barely perceived or not perceived at all by the University community and to monitor progress achieved in terms of gender equality. Data contained in the University of Milano-Bicocca Gender Budget Report reveal a higher percentage of women, both among students and workers, if compared to national trends (University of Milano-Bicocca, 2018). In January 2018 (33.452 students enrolled), women outnumbered male students and the overall feminization rate was 61,1%. Specific disciplines/areas were highly feminized, for example, Midwifery (99%), Primary Education (95,9%), and Social Work (93,1%). In the same year, the proportion of women holding faculty position was 44% and women accounted for 60% of the administrative and technical personnel.

[37] Positive actions were introduced by Italian Law no. 125/1991. Furthermore, Legislative Decrees no. 198/2006 and no. 5/2010 (following the European Directive 2006/54) set the obligation for Public Administrations (and therefore public Universities) to adopt a Positive Action Plan (PAP), aimed at assuring the removal of all obstacles hindering equal opportunities between women and men at work. This three-year strategic planning document contains the positive actions planned to promote gender equality, together with monetary and human resources devoted to achieving such positive actions.
[38] According to the European Institute for Gender Equality (EIGE), gender-sensitivity has the «aim of understanding and taking account of the societal and cultural factors involved in gender-based exclusion and discrimination in the most diverse spheres of public and private life» (EIGE: https://eige.europa.eu/thesaurus/terms/1247).
[39] The Italian Research Institute CENSIS-Centro Studi Investimenti Sociali has classified Universities into four categories based on their size: small ones (less than 10,000 students); medium ones (between 10,000 and 20,000 students); large ones (between 20,000 and 40,000 students) and very large ones (over 40,000 students).

Gender Budget Report also highlight gender differences in career progression. Women's numerical presence is high at the early stages of career, with 51,2% of PhD students and 52,9% of post-docs being women.[40] Nevertheless, women's career progression is slower: women take an average of 2 years longer in jumping to a superior position than their male counterparts. As illustrated in figure 1, women seem more likely to face barriers along career paths (leaky pipeline[41] phenomenon) and be prevented from reaching apical positions ('glass ceiling' effect[42]). This negative trend is, however, decreasing over the years and the University of Milano-Bicocca shows a better performance than the national average: 32% of full professors are women compared to 22,2% at the national level (latest available data, August 2018). The data reveal remarkable differences among Departments: a marked presence of women in Sociology, Psychology, Biotechnology and Medicine and a lower presence in Economics, Statistics and Physics. In the latter disciplines, women are more likely to face the so-called 'sticky floors' phenomenon, a term used to describe discriminatory patterns that keep workers, mainly women, in the lower ranks of the job scale (Booth, Francesconi and Frank, 2003). Women are 'stuck to the floor' by invisible barriers to career advancement, such as gender stereotypes, gender discrimination and the lack of investment.

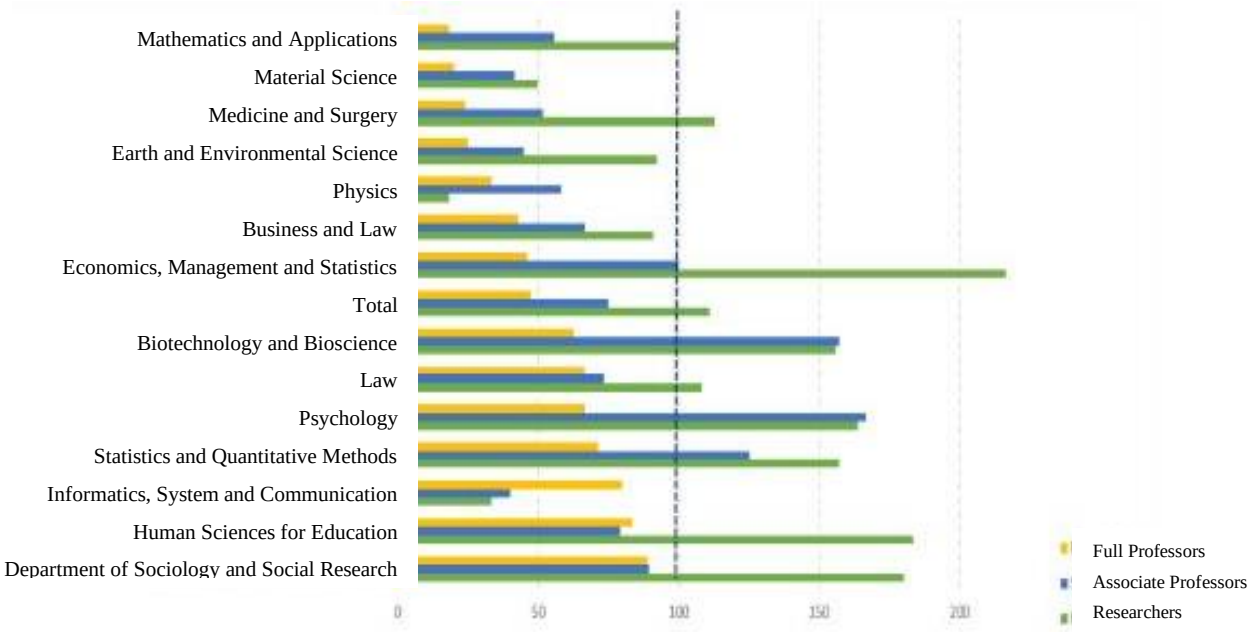


Figure 1. Gender Ratios (female to male) by Academic Role and Departments
Source: Gender Budget Report (Bilancio di Genere 2018) 31/12/2017

What positively characterizes the specific case of Milano-Bicocca is the high presence of women at apical positions in the university governance. Milano-Bicocca is one of the few Italian Universities with a woman as its Rector: Professor Giovanna Iannantuoni (2019-2025).[43] The previous Rector

[40] In 2018, women constituted 55,4% of the total number of students enrolled at public universities, 57,1% of the university graduates, 49,4% of those enrolled in PhD programmes and 50,5% of the PhDs (Morana and Sagramora, 2020).
[41] A metaphor that refers to the gradual exit of women as they move towards the top of particular careers, leading to women's underrepresentation (Alper, 1993).
[42] This metaphor (Baxter and Wright, 2000; Ferree and Bandana, 2000) describes the occupational development as having a stop at the top. It is an invisible barrier that may keep women from getting promotions, pay raises and other opportunities.
[43] The other six Universities having, in 2020, a woman rector are the following: Basilicata, Cagliari, Perugia-University for Foreigners, Naples L'Orientale, Valle d'Aosta and the Public University Institute Sant'Anna School of Advanced Studies based in Pisa.

(Professor Cristina Messa, 2013-2019) was also a woman, as well as the current Administrative Director. Also, six women (out of 14) are serving as Departments heads. Data thus reflect a rather positive situation, marked by both a significant proportion of women at top management positions and a balanced gender composition of decisional boards, if compared to the national average. According to the already mentioned study by Mazzotta et al. (2019), 'mixed' boards would be positively related to a more gender-sensitive governance.

The University of Milano-Bicocca is committed at supporting forms of work flexibility and at promoting work-life balance, also by providing pre-school services for children of academic staff, administrative staff and students: a Nursery (Nido Bambini Bicocca, established in 2005) and the Infant School (Scuola dell'Infanzia) 'Bambini Bicocca', opened in 2017. The University is among the most active ones in terms of interdisciplinary research on women and gender issues. Over the years, it has promoted several projects and initiatives to implement gender-sensitive research and education activities on gender differences and inequalities. Different bodies and subjects, with different tasks and objectives, have been engaged to support gender equality:

1. *Interdepartmental Centre for Gender Studies-ABCD* (https://abcd.unimib.it/) that, since the end of the Nineties, promotes interdisciplinary research on gender issues and gender-equality in research. It currently includes 12 Departments, from both HSS (Humanities and Social Sciences) and STEM areas. ABCD contributes to disseminating gender-sensitive knowledge through research activities and publications and encourages public debate on gender-related issues by organizing and sponsoring conferences, seminars, meetings and educational events;
2. *Interuniversity Centre 'Gender Cultures'* (http://www.culturedigenere.it/), founded in 2013. It is an interdisciplinary centre, covering the area of gender equality and women's participation and representation, formed by 6 Universities. It promotes networking and mutual learning and the integration of gender into research;
3. *Departmental Centre ADV-Against Domestic Violence* (http://www.adv-project.unimib.it/), established in 2013. ADV aims to combat domestic violence and gender-based violence through research and educational projects and to support gender equality in research policy and research organisations;
4. *CUG-Comitato Unico di Garanzia/Guarantee Committee for the Promotion of Equal Opportunities, Workers' Welfare and Non-Discrimination*[44] (https://www.unimib.it/ateneo/organi/comitato-unico-garanzia), set by Rectoral Decree in 2014. It is an institutional body aimed to promote equal opportunities among all members of the University community, the wellbeing of workers and workers' rights, and to prevent and contrast all forms of discrimination;
5. *Confidential Counselor,* an external professional designed to support workers against sexual harassment and moral or psychological violence motivated by gender, sexual orientation, ethnic orientation, religion, personal and political beliefs, disability and age;
6. *Framework Convention 'Gender and Religions',* a confederation of about 30 Italian Universities and 15 Research Centers across Italy, launched by the University of Milano-Bicocca in 2016 and signed by all parties in March 2018. Aim of the FC is to enhance knowledge sharing and research collaboration on the relationship between social change, gender identities and religions in the contemporary world and to promote women's empowerment and gender equality within religion.

Despite the persistence of gender disparities, the Milano-Bicocca case shows, as briefly illustrated, commitment and anti-bias efforts. As noted (European Community, 2016, p. 3), the successful implementation of targets to create action for gender equality implies a change in culture which should be accompanied with appropriate awareness raising, training and research efforts, showing the benefits that institutions can draw from a better gender balance and a more equal treatment of women and men.

[44] Directive 4 March 2011, Presidency of the Council of Ministers. CUG brings together relevant expertise from two existing Committees: the Committee for Equal Opportunities and the Anti-mobbing Committee.

4. Conclusions

The Gender Budget Report of the University of Milano-Bicocca reveals that significant progresses have been achieved, but further efforts need to be made as gender inequalities are still significant. Far from being homogeneous, unequal degrees of inclusion(s) can be identified, demonstrating uneven gender distribution in various fields of science both in respect to students and researchers and unequal professional trajectories of women and men. The fact that there are women at the top of the pyramid scheme is a very encouraging signal, but this cannot be interpreted as evidence of a fully achieved gender equality.

To manage such a complex and multidimensional issue, the 'not neutral' role of turning visible some implicit 'inconvenient truth' of unequal inclusion(s) in the academia is noteworthy. In this sense, the Gender Budget Report may play a significant role in disvealing gender dynamics and gender bias, enabling transformations in academic governance. However, a gender-sensitive framework is needed: as written (Powell, 2018), feminist knowledge can help lead the way toward gender equality in academia, in which relations of power, local and national contextualizations, as well as categories of discrimination and gender stereotypes, can be made visible.

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Journal editorships and inequality in academic fields. A study on an affiliation network of Italian sociology journal boards

Marco Serino, Ilenia Picardi

Abstract

This chapter aims to discuss gender and academic status inequalities in the composition of the committees of Italian top-ranked sociology journals from a social network analysis perspective. Scholars gain participation in academic journal boards thanks to their individual characteristics and academic position or experience. However, roles and memberships are often unequally distributed within these boards, where gender differences (i.e., female scholars are underrepresented or hold the position of editors-in-chief less frequently than male ones) are often neglected or unnoticed and may also be intertwined with disparities in the participation of less established researchers. These inequalities do matter in the networks formed by joint memberships in journal boards, within which scholars may hold more or less advantageous or powerful positions. Hence, the chapter first presents a descriptive analysis of the composition of the committees of Italian top-ranked sociology journals – i.e., those which have been acknowledged as "Class A" journals by the Italian National Agency for the Evaluation of Universities and Research Institutes (ANVUR) – focusing on gender, academic position and the geographical area of affiliation of their members. Following Bourdieu's theory of academic and scientific fields, academic position is considered as an indicator of academic and symbolic capital, while direction of journal boards stands for possession of scientific capital. Then, journal board memberships are formalized as an affiliation network of Italian sociologists (actors) involved as members or editors-in-chief in the set of journal boards (events) thus selected. The scholar-by-scholar one-mode network derived from that affiliation network is analysed in order to highlight the differential positioning of scholars within it, using network centrality measures as indicators of social capital. The findings of this study show that few women with high academic status, along with several less established (fixed-term) researchers, occupy leading positions within these journal boards and in the related network, while male, academically prominent scholars (working mainly in institutions located in Italy's northern or central regions) are the dominant figures. Therefore, women and less established scholars, as well as those who are affiliated with institutions located in Southern Italy, seem to be largely excluded from accumulation of symbolic capital associated with memberships in these journal boards, nor are they able to benefit from (and utilize) the related social capital.

1. Inequalities in scientific and academic fields: Social structures and capital forms

University systems are currently experiencing transformations that expose more precarious academic staff to incertitude and inequality conditions (Lempiäinen, 2015; Herschberg, Benschop, and van den Brink, 2018; Morgan and Wood, 2017; Murgia and Poggio, 2018). Indeed, inequalities in academic and scientific domains can be related to differential positions in hierarchies, or to personal traits – such as gender, age, race, social origins, and so forth – which may entail differences in the rate of access and success within these fields. These differences are, however, frequently underestimated or disregarded and thus end up being mainly unnoticed – that is, hardly recognizable – in such systems of production of knowledge (Picardi, 2019; Lundine *et al.*, 2019). Current research on gender disparity in science revealed that women tend to be still underrepresented in academic and scientific fields and/or to experience difficulties in progressing over their careers, and are often stuck in precarious academic roles and/or end up leaving academia (Murgia and Poggio, 2018; Picardi, 2020; Schröder, Lutter and Habicht, 2021). Other forms of disparities are concerned with the impact of reforms in academic recruitment, which, although allegedly based on meritocratic criteria, end up

making access to stable academic positions more and more difficult for those who enter the system and experience long-term precariousness (Murgia and Poggio, 2018; Grüning and De Angelis, 2020). Scientific journal boards do not make an exception in such trends. Female scholars often turn out to be underrepresented in journal boards of different disciplines, be they STEM or the social and economic sciences (e.g., McNamee, Willis and Rotchford, 1990; Metz and Harzing, 2009; Topaz and Sen, 2016). Besides, other scholars' characteristics, such as academic rank and prestige, and the institutions which scholars are affiliated with (Crane, 1967; Goyanes and Demeter, 2020), do matter in gaining journal editorships. This also has implications that reflect the recent changes in the policies and practices of national academic systems and scholarly publication, together with changes in the social and professional world of academic (and non-academic) researchers, as is the case with Italian university (Colarusso and Giancola, 2020; Grüning and De Angelis, 2020).

It is also worth noting that these gaps might affect publication policies, in that journal editors are the «gatekeepers of science» (De Grazia, 1963; Crane, 1967) who play a chief role in disseminating and legitimizing research findings, these processes being subject to biases related to the professional status of editors, referees and the authors of submitted papers (Crane, 1967; Zuckerman and Merton, 1971). In this respect, even though women may not be penalized by the peer-review and editorial processes, overcoming gender biases in journal boards and referee pools might help journals to promote increased participation of female scholars and more equity in academic publishing (Squazzoni *et al*., 2021; Lundine *et al*., 2019).

Inequalities in the social structures of scientific production systems can be related to the participation of scientists in their community. Interacting with one another and being, thus, aware of one another, as is the case with the so-called *invisible colleges* (Price, 1963; Crane, 1972), is a way to perpetuate or overcome such inequalities. Actually, an invisible college might even reinforce social stratification in scientific fields (Willis and McNamee, 1990), and we argue that such a stratification can also be identified in networks of journal board memberships. In fact, social factors might count in different stages and practices of scientists' work, like the selection of articles in journals, which may depend on the degree of diversity of the characteristics of journal editors (Crane, 1967; Goyanes and Demeter, 2020), while scholars' characteristics may affect visibility and awareness in scientific networks as revealed by sociometric inquiries and network analysis (Cole and Cole, 1968; Breiger, 1976).

Another key point is the way specific forms of assets, or *capital*, do matter in the functioning of academic and scientific fields. According to Pierre Bourdieu (1988), in academic fields scholars exert their power by means of specific capital forms like the «capital of academic power», which may concern membership or direction of an institute, or the «capital of scientific power», which is exemplified by «direction of a research unit» or «of a scientific review» – as is the case with the present study (Bourdieu, 1988, p. 40). These powers all rely upon some form of recognition or, more precisely, on accumulation of symbolic capital. However, these *institutional* forms of capital (Bühlmann *et al*., 2017) often imply some kind of affiliation in groups. The relational nature of symbolic capital works well in this case, in that «symbolic capital is connected to groups or to the names of groups, alliances with groups through social ties are effective weapons in this battle» (De Nooy, 2003, p. 78). In this sense, a proper form of *relational* capital is social capital, which Bourdieu defines as «the aggregate of the actual or potential resources which are linked to possession of a durable network of more or less institutionalized relationships of mutual acquaintance and recognition – or in other words, to membership in a group» (Bourdieu, 1986, p. 248). Notably, this capital form is chiefly capable of different formalizations in social network analysis (SNA) (Borgatti, Jones and Everett, 1998).

Hence, in the following we shall present an analysis of the affiliation network made of Italian sociologists (tenured and non-tenured researchers) participating in the boards of Italian top-ranked – "Class A" – sociology journals. Our analyses concentrate on how the different gender groups and academic staff categories are represented within these journal boards and, more specifically, in the networks formed by scholars' participating in the same boards as members or editors-in-chief. An affiliation network constitutes of two sets of distinct units, namely actors and events, in such a way

that actors are connected to events (Wasserman and Faust, 1994). In our approach, journal boards' members are the actors and journal boards are the events. However, in the current treatise we will focus on scholars and not on journals. In particular, we aim at addressing the following research questions: a) how differently patterned is the composition of journal boards in the field of Italian sociology in terms of gender, academic position and geographical location of scholars' affiliation; b) what kind of distinctions can be found in these boards with regard to the diverse roles scholars play within them (e.g., being a male or female editor-in-chief, or a non-tenured scholar member of an editorial board, etc.) and to their location within these network structures; c) to what extent different assets (i.e., capital forms) matter in structuring the (networked) field at issue.

2. Data and methods

Our data consist of 594 academic and non-academic Italian sociologists[45] who sit in the boards of 32 Italian sociology journals selected among those pertaining to the "Political and Social Science" area and classified as top-ranked "Class A" journals by the Italian National Agency for the Evaluation of Universities and Research Institutes (ANVUR). The selection of these journals was made according to the following criteria: a) being pertinent to sociological subsectors in Italy's university system; b) having sociological relevance based on the journal's "aim & scope" description; c) being issued by an Italian publisher[46].

Information on the sociologists included in the dataset (gender, scientific-disciplinary sector, academic/institutional affiliation and academic/research position) have been retrieved from the database of the Italian Ministry of Education, Universities and Research (MIUR, in Italian) as well from the websites of other Italian research centres, and are updated November 2019.

As for journals, we consider the difference among three types of board (i.e., scientific, editorial and managing boards) because of the different kind of activities pursued and the scholars involved therein. Even if not all journals preserve such a distinction, we assume that scientific boards play a symbolic and legitimizing role for the journal and guarantees more specifically the latter's credibility, while editorial boards sustain more generally a journal's policy towards publication and the related concerns. Finally, managing boards mainly deal with organizing activities needed to run the journals, particularly when, in the same journal, these boards are distinct from the editorial and scientific committees.

In the following, we shall perform a descriptive analysis of the composition of journal boards and a statistical and visual analysis of the sociologist-by-sociologist one-mode network projection derived from the affiliation network. In such a network, each link between two scholars means that they sit on the same journal board(s). As for centrality measures for affiliation networks, we use raw degree centrality, defined as follows: «the degree centrality of an actor is the number of events with which it is affiliated and the degree centrality of an event is the number of actors affiliated with it» (Faust 1997, p. 166). In addition, we use degree centrality (in its raw and normalized version) and betweenness centrality for one-mode networks[47]. Degree centrality relates to the number of other actors a given actor is connected to in the network; betweenness centrality has, instead, to do with «the extent to which a particular point lies 'between' the various other points in the graph»; this index

[45] We selected these scholars among the total of 934 Italian scholars from various disciplines who appeared on the boards of the journals under consideration. The list of journals we refer to is the one provided by the classification of November 2019.

[46] The 32 journals selected are: *Annali di Sociologia*; *Comunicazione Politica*; *Comunicazioni Sociali*; *Daedalus - Quaderni di Storia e Scienze Sociali*; *Etnografia e ricerca qualitativa*; *Italian Journal of Sociology of Education*; *Meridiana*; *Mondi Migranti*; *Partecipazione e Conflitto*; *Polis*; *Politiche Sociali*; *Problemi dell'Informazione*; *Quaderni di Sociologia*; *Quaderni di Teoria Sociale*; *Religioni e Società*; *Rassegna Italiana di Sociologia*; *Rassegna Italiana di Valutazione*; *La Rivista delle Politiche Sociali*; *Salute e Società*; *Scuola Democratica*; *Sociologia del Diritto*; *Sociologia*; *Sociologica*; *Sociologia del Lavoro*; *Sociologia e Politiche Sociali*; *Sociologia e ricerca sociale*; *Stato e Mercato*; *Studi Culturali*; *Studi Organizzativi*; *Studi di Sociologia*; *Sociologia Urbana e Rurale*; *Tecnoscienza*.

[47] On these centrality measures and their calculation, we refer the reader to the relevant literature (Freeman, 1979; Wasserman and Faust, 1997; Scott, 2000).

is of key interest as it «measures the extent to which an agent can play the part of a 'broker' or 'gatekeeper' with a potential for control over others» (Scott, 2000, p. 86; Freeman, 1979). We will use these network measures as an operationalization of social capital, in that both degree and betweenness centralities have a positive association with this capital form (Borgatti, Jones and Everett, 1998, p. 31). Network analyses and visualizations have been performed via the *R* package *igraph* (Csardi and Nepusz, 2006) and the software *Gephi 0.9.2*.

3. Results

3.1 Journal boards' composition

Descriptive statistics concerning the composition of the journal boards under investigation (see tab. 1) show that the majority of the board members are established or well-recognized professors or researchers: around 40% of them are full or associate professors, and a quarter are professors in retirement or senior/emeritus professors (i.e., retired but still active as members of a university department). These positions represent the "establishment" of the academia and seem to rule these journal boards as well. This is notably true for the subgroup of the editors-in-chief, in which senior or emeritus professors and retired ones are far more represented (19,3% and 16,9%, respectively). More than a half of the editors-in-chief are, however, full or associate professors; along with the aforementioned ones, these are the academic positions that lead these journals (89% of those holding this role in journal committees). Assistant professors, who hold a permanent position no longer available in the current system – after the 2010 "Gelmini reform" (i.e., the Law 240/2010) – and constitute a small amount of the current teaching and research stable personnel in Italian university[48], are only 7,7% of the total of board members and 3,6% of the editors-in-chief. Notably, while fixed-term assistant professors (type A and B)[49] are only around 8% of the total of board members, 2,4% of those of type B (i.e., a tenure-track position) are also editors-in-chief. Other positions in universities are weakly represented, particularly among the editors-in-chief, while non-academic researchers or directors of research institutions are nothing less than a minority.

As for the composition of boards by gender, a first indication of inequality is apparent: overall, 61,3% of the board members are men, while 38,7% of them are women[50]. Again, the difference increases if editors-in-chief are considered: 71% of them are male scholars. Also unequal is the composition of the committees according to the geographical area: scholars from academic and research institutions located in Southern Italy and the Isles are clearly underrepresented, being only 14,5% of the total, whereas 58,9% of board members come from institutions of Northern Italy, and 26,9% from the Centre.

It is also worth noting the peculiar composition of the different types of committees within journals. In scientific committees (which include advisory boards), retired and full professors (31,6% and 36,7%) are the dominant positions, followed by senior or emeritus professors (15,6%), while associate professors are present to a much lesser extent. This type of board is, thus, chiefly associated with the symbolic capital of retired and senior/emeritus professors and with the high academic capital of full professors. Instead, editorial boards include 31,5% of associate professors, followed by full professors (23,9%) and retired professors (13,6%), but these positions become even smaller in extent in the case of managing boards, where only associate professors still amount to almost a quarter of the total.

[48] These researchers amount to 8.997 units in 2020 and were 25.584 in 2008, with a variation of -64,83% from 2008 to 2020 (Stazio, Traiola and Napolitano, 2021, p. 37)

[49] The two fixed-term positions have been established by the Law 240/2010. Although we consider them altogether, it should be stressed that assistant professors of type B can be seen as prospective associate professors, because of the tenure-track system designed by the Gelmini Reform in 2010, while those of type A, after their three-year contract (possibly renewed for two additional years), have no guarantee of pursuing their career and gaining tenure.

[50] The same percentage of women (38,5%) is found in the composition of the current Italian academic research and teaching staff (Stazio, Traiola and Napolitano, 2021, p. 435).

Interestingly, less powerful academic positions follow an inverse trend. First of all, in managing boards assistant professors double in proportion with respect to those in editorial boards; the same holds true for their incidence in the composition of editorial boards than in scientific ones. Analogously, fixed-term assistant professors (type A and B) increase in proportion from 0,4% and 1,6%, respectively, in scientific boards, to 7,2% and 6,8% in managing boards. Indeed, less established figures like post-doctoral fellows or teaching/research assistants are virtually absent from scientific committees and, instead, far more represented in managing boards (9,3% and 11,4%, respectively). In sum, the weight of the most important figures in the academic hierarchy clearly declines across scientific, editorial and managing boards, while the incidence of unsecure and less prestigious categories increases. As for gender differences, the trend is quite similar: women are far more represented in managing boards than are in scientific or editorial boards, while for men the reverse is true. Differences in the geographical area where the scholars sitting in the three types of board come from seem to follow the general trend.

Tab. 1. Composition of the journal boards by scholars' academic role, gender and geographical area (percentages).

	Board member	**Editor-in-chief**	**Member of scientific board**	**Member of editorial board**	**Member of managing board**
Academic role					
Senior – Emeritus Professor	8,6	19,3	15,6	7,1	1,3
Retired	16,7	16,9	31,6	13,6	5,9
Full Professor	21,9	26,5	36,7	23,9	9,3
Associate Professor	20,9	26,5	6,3	31,5	23,6
Assistant Professor (tenured)	7,7	3,6	3,1	6,0	12,7
Assistant Professor - type A (non-tenure-track)	3,4	0,0	0,4	3,8	7,2
Assistant Professor - type B (tenure-track)	4,5	2,4	1,6	6,0	6,8
Adjunct Professor	4,4	1,2	1,2	1,6	8,9
Postdoc	3,9	0	0,0	1,6	9,3
Teaching/Research Assistant	4,7	1,2	0,8	2,2	11,4
Director of a Research Centre	1,9	2,4	2,3	0,5	0,8
Non-academic Researcher	1,5	0,0	0,4	2,2	3,0
Gender					
Women	38,7	28,9	27,7	31,0	51,9
Men	61,3	71,1	72,3	69,0	48,1
Italy's area					
North	58,6	59,0	52,0	56,0	65,4
Centre	26,9	27,7	34,0	25,5	22,4
South-Isles	14,5	13,3	14,1	18,5	12,2
Total %	100,0	100,0	100,0	100,0	100,0
Total *N*	594	83	256	184	237

In addition, it should be stresses that differences in boards' composition concerned with gender and academic rank might be intertwined. The diagram in Figure 1 depicts the percentage of academic positions within each gender group[51] and shows the great divide between male and female scholars who are senior/emeritus/retired professors or full professors, with more board members who hold this position among men than among women. Instead, lower-ranked positions are more frequent among women than among men, with an increasing gap between the two gender groups when the position

[51] We use these percentages instead of the proportion of men and woman within each academic rank group because the latter choice would rather make sense when analysing the composition of academic staff in university systems (see Picardi, 2020; Stazio, Traiola and Napolitano, 2021).

considered is the most unsecure, i.e., that of postdocs and research or teaching assistants. On the one hand, this suggests a three-fold advantage (disadvantage) that relates to being more (less) represented among board members when being, at the same time, male (women) and academically high-ranked (low-ranked). On the other hand, as far as other positions are concerned, the trend is not so straightforward, in that it begins to reverse with associate professors – there are more such positions among female members than among male ones (although the gap is small) – and persists with a distance between men and women in favour of the latter. Nonetheless, this leads to reinforce the disadvantage of being both a female and a precarious scholar who stands in the minority of the members of these journal boards.

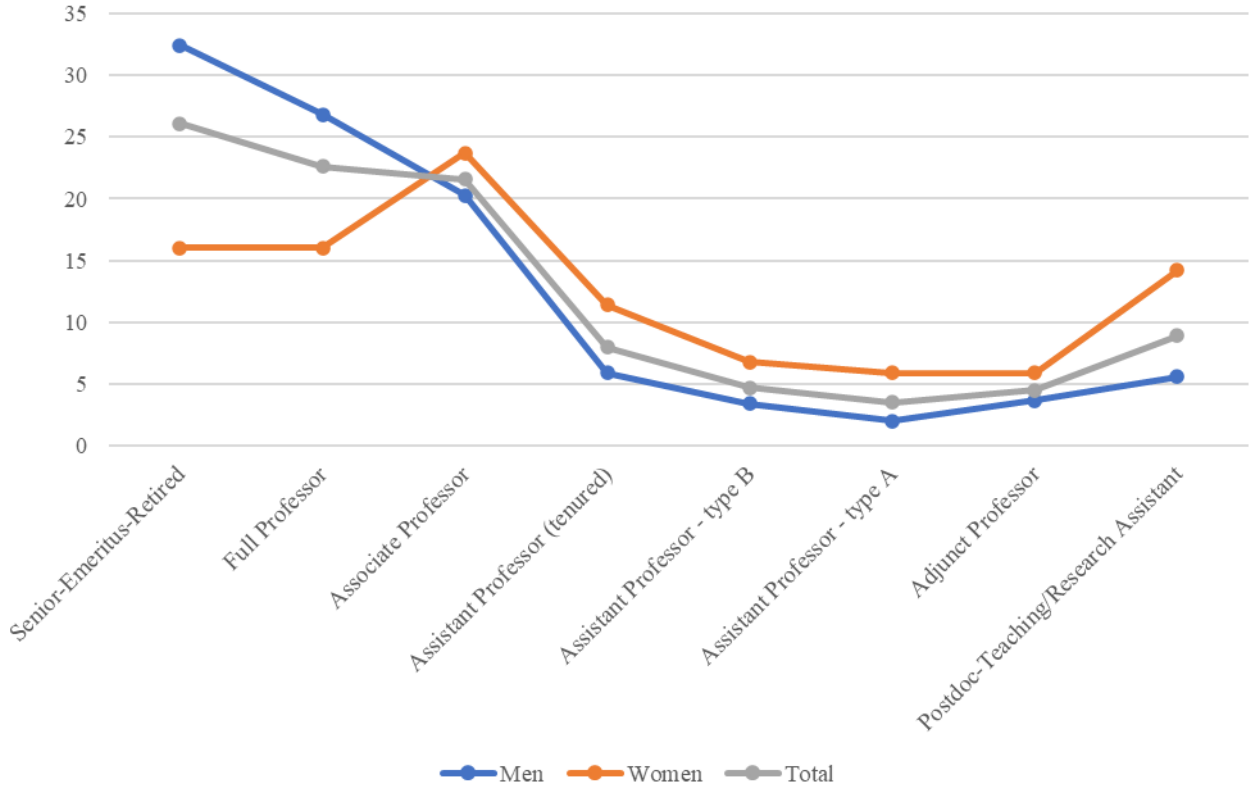


Figure 1. Percentage of board members by gender and academic rank. Percentages are calculated within the modalities of the gender variable (men: N=355; women: N=219) and for the total (N=574); directors of research centres and non-academic researchers are excluded

Furthermore, a key distinction to be made among the different groups of scholars is the one concerned with the number of journals whose boards they participate in – i.e., their *two-mode degree*. Among the scholars with the highest degree (members of three or more journal boards), gender disparity is striking: more than 80% are male and only 17% are female (Figure 2). Indeed, passing from scholars participating in one board to those who are members of two or three boards or more, the percentage of male scholars increases and that of female scholars decreases. As for academic rank (Figure 3), senior/emeritus professors, retired professors and full professors are virtually the sole academic positions that hold three or more editorships (along with just one associate professor and one fixed-term assistant professor of type B). Associate, full and retired professors remain dominant among those who hold two or one editorship only, albeit the latter's group is more fragmented as for the different academic positions represented therein. Finally, also in this case differences according to the geographical area of scholars' affiliations (Figure 4) do not count much in discriminating the different subgroups.

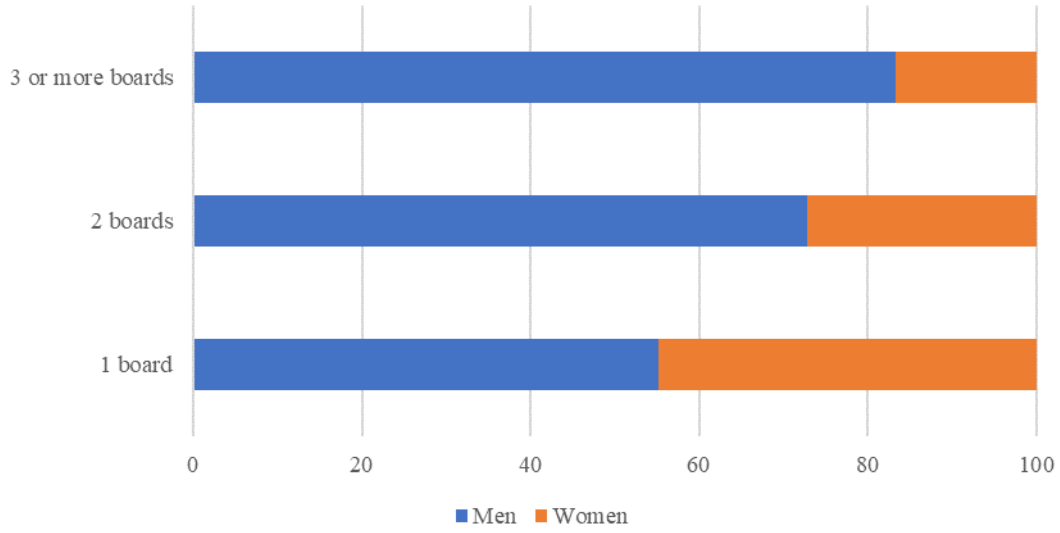


Figure 2. Percentage of journal board members by gender and the number of boards they participate in.

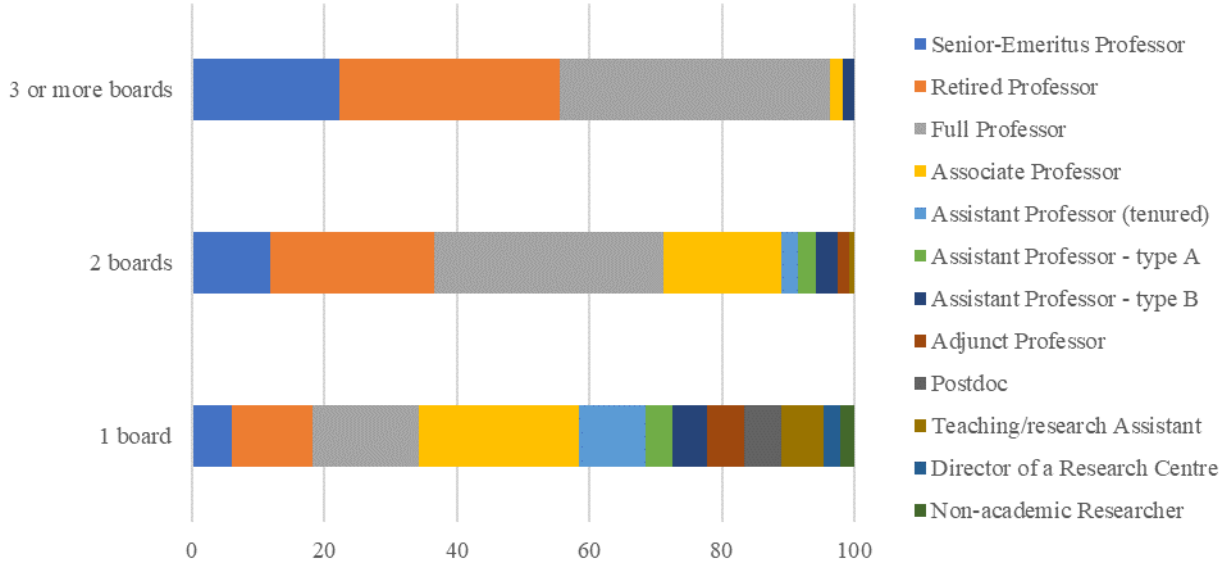


Figure 3. Percentage of journal board members by academic rank and the number of boards they participate in.

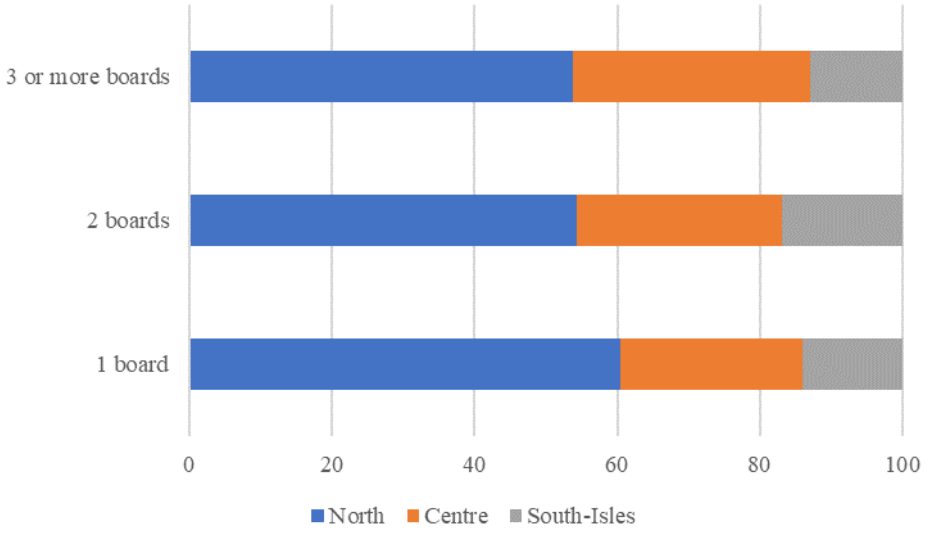


Figure 4. Percentage of journal board members by Italy's geographical area and the number of boards they participate in.

3.2 Network structure

By focusing on the scholar-by-scholar projection of the whole affiliation network of journal board memberships, we can visually explore the structural features of the network of co-memberships in journal boards among the different sociologists. We do so by examining the network statistics displayed in tab. 2 and by inspecting the related network graphs with regard to one-mode degree and betweenness centralities (Figure 5). Recall that each line between two nodes means that the two scholars jointly participate in one or more journal boards. The one-mode degree is, then, the *potential* number of other sociologists that one can be able to be in contact with. In addition, the graphs shown henceforth also depict the weights of each link between two scholars through the width of the lines, that is, the number of journal board memberships shared by any two scholars (we will discuss these weighted connections later on).

First, the co-membership network is not very dense, and yet it is made of a *connected component*, since «all of its points are linked to one another through paths» (Scott, 2000, p. 101). All scholars are, then, linked to and through each other and no one among them is an "isolate". Indeed, the maximum distance between any two scholars, i.e., the network *diameter*, equals to 5, meaning that the farthest two scholars are separated up by five intermediate contacts. As a result of the conversion from the scholar-by-journal network, and depending on the size of each journal board[52], the average degree, i.e., the mean number of scholars which a given sociologists is connected to, equals to 58. A large degree variability is observed, however, with an asymmetric degree distribution (see Figure 6), considering that a few nodes have a disproportionately high degree. Furthermore, the network is highly clustered: the average clustering coefficient is 0.89, which means that one's neighbours (i.e., one's direct contacts) also tend to be linked to each other. Interestingly, the average path length is small: it takes around two intermediate contacts to let two scholars be connected, on average[53].

Indeed, the overall structure of the network is worthy of further analysis and reflections. For instance, it is apparent from the graphs shown in Figure 5 that the network is made of different subgroups, and how the nodes in the centre are distinct from those constituting the periphery. Stokman and Snijders, in an unpublished work (cited in Scott, 2000, pp. 90-91), define the centre of a network as «the set of

[52] Considering only those board members who are sociologists, board sizes range from a minimum of 5 members to a maximum of 114, with a mean of 26.4 members.

[53] In the SNA literature, this combination of high local clustering and short distance among the actors in the network is known as one of the features of "small world" networks (Watts, 1999). Albeit it might be reasonable that the network analysed here would look like a small world, this matter should be better addressed as a hypothesis in future work.

points with the highest point centrality scores», while the points with the lowest centrality scores make up the periphery (Scott, 2000, p. 90).

Tab. 2. Network statistics

Measure	**Value**
No. of nodes	594
No. of edges	17.267
Density	0,10
Network diameter	5
Average degree	58,14
Degree (min, max, median)	4,.239, 42
Average norm. degree	0,10
Norm. degree (min; max; median)	0,01; 0,40; 0,07
Avg. clustering coefficient	0,89
Avg. path length	2,29

Looking at the degree centrality values, the network analysed in this work exhibits a clear centralization (whose score – on a scale ranging between 0 and 1 – is, however, relatively low: 0.31). The centre of the graph is, then, located in the bundle of nodes with the highest degree centrality. There is also a "margin", i.e., «the set of points that clusters close to the centre and that is, in turn, divided from the 'peripheral' points by a further break in the distribution of centrality scores» (Scott, 2000, p. 91). This margin comprises those scholars who retain a raw degree centrality comprised between 70 and 110, and whose nodes lie around the dense core of the graph, while peripheral nodes – with a raw degree score of less than 70 – are located in the extreme areas of the graph.
Nonetheless, scholars who are part of the bundles of actors located farther from the centre of the graph are those who participate in one board only (and who, thus, constitute a *clique* with the co-members of the same board). There are, however, some sociologists whose location in the graph is distant from both the centre and those peripheral or semi-peripheral bundles of nodes. Indeed, these scholars appear to stand *between* different subsets of nodes, these subsets being positioned either at the extremes of the graph or around the centre. They seem not to belong to specific subgroups but to participate in different ones (that is, in different boards as well).

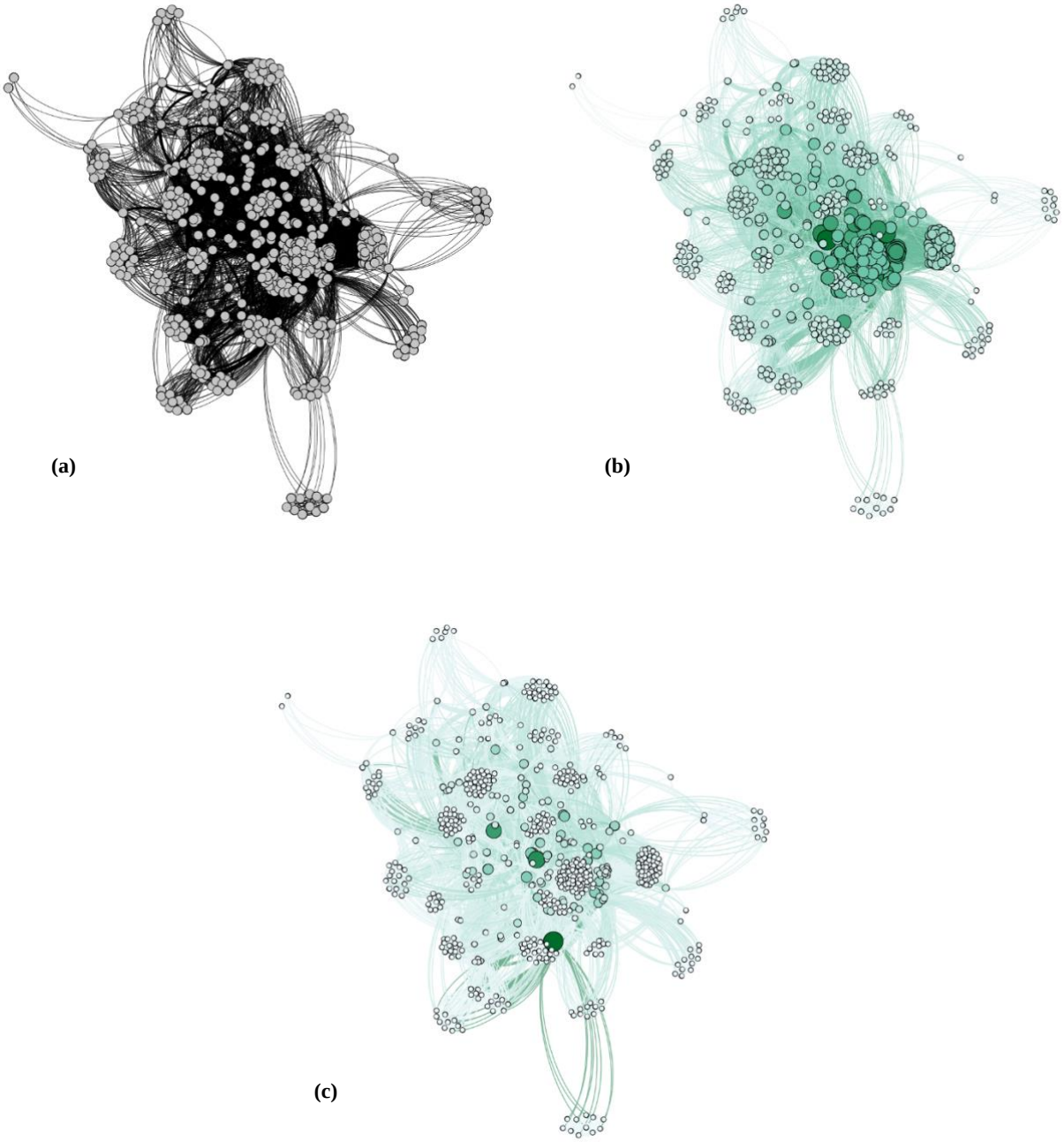


Figure 5. One-mode scholar-by-scholar network displaying the raw graph (a), and the same graph with node colour shades and sizes proportional to degree centrality (b) and betweenness centrality (c).

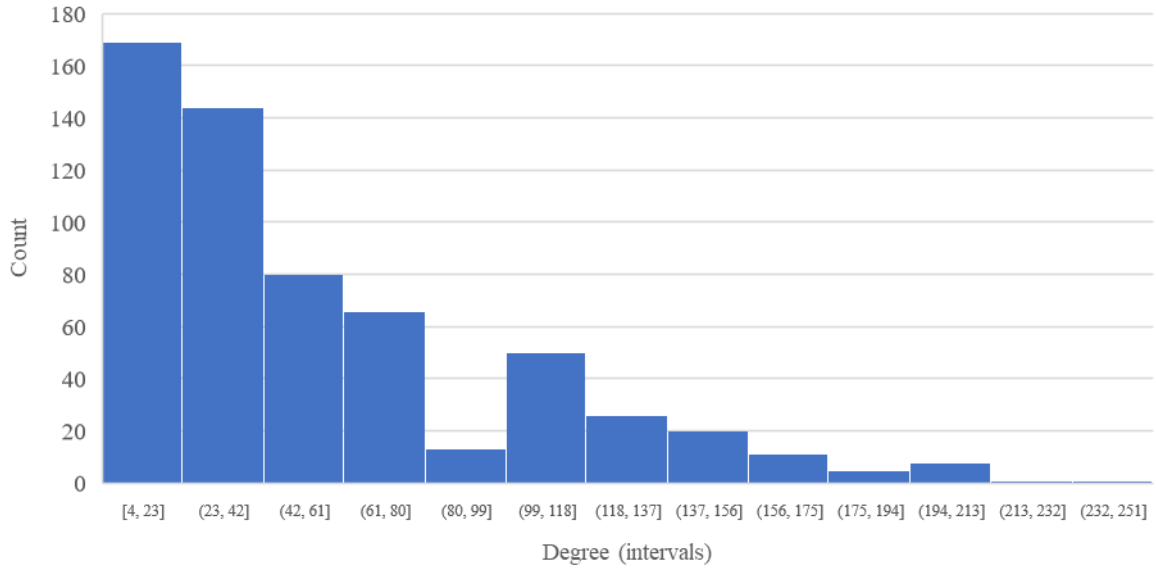


Figure 6. Degree distribution (histogram).

3.3 Network properties and scholars' characteristics

As for scholar's characteristics related to network structure, gender disparities, albeit not so straightforward in this respect, are nonetheless of interest. Overall, as for degree centrality, few women are very central in the network, and those who are central lie mainly in the core of the graph, along with the most central scholars are located (Figure 7a). Considering a normalised degree centrality score of 0,19 as a threshold[54], scholars holding this or a higher value are 63% male and 37% female. In addition, three female scholars – i.e., those with the highest degree centrality in their gender group – are virtually in the very centre of the network and are thus connected to the core actors. As for betweenness centrality (Figure 7b), it has to be noted that three scholars (the largest nodes in the graph) representing two men and one woman exhibit the highest centrality. Anyway, among the ten most central scholars who dominate the top ranking of this measure, seven are women. Academic rank also matters in distinguishing scholars by their centralities. Figure 8a shows that retired, senior, emeritus and full professors are the most frequent positions among the highly central scholars located in the core of the graph, along with several fixed-term assistant professors and just one research assistant and one tenured assistant professor. Instead, setting node sizes according to betweenness centrality (Figure 8b) highlights the same three mostly central nodes as above, which represent two (male) full professors and a (female) retired professor, who thus retain some noticeable power of brokerage.

The geographical area is another attribute which deserves attention even in visually inspecting the networks. Actually, among those with a normalized degree of 0,19 or above (119 scholars) only 21 (around 18%) are affiliated with institutions located in the South and the Isles (Figure 9a). This would signal a form of discrimination against scholars belonging to these areas. Hence, in this picture it turns out to be more striking that the core area of the graph is dominated by affiliations with Italy's northern or central institutions. Considering betweenness centrality scores (Figure 9b), we find here the same three most central nodes already noted above, who are affiliated with one central and two northern institutions.

[54] This is the value below which the score on this measure decreases more significantly.

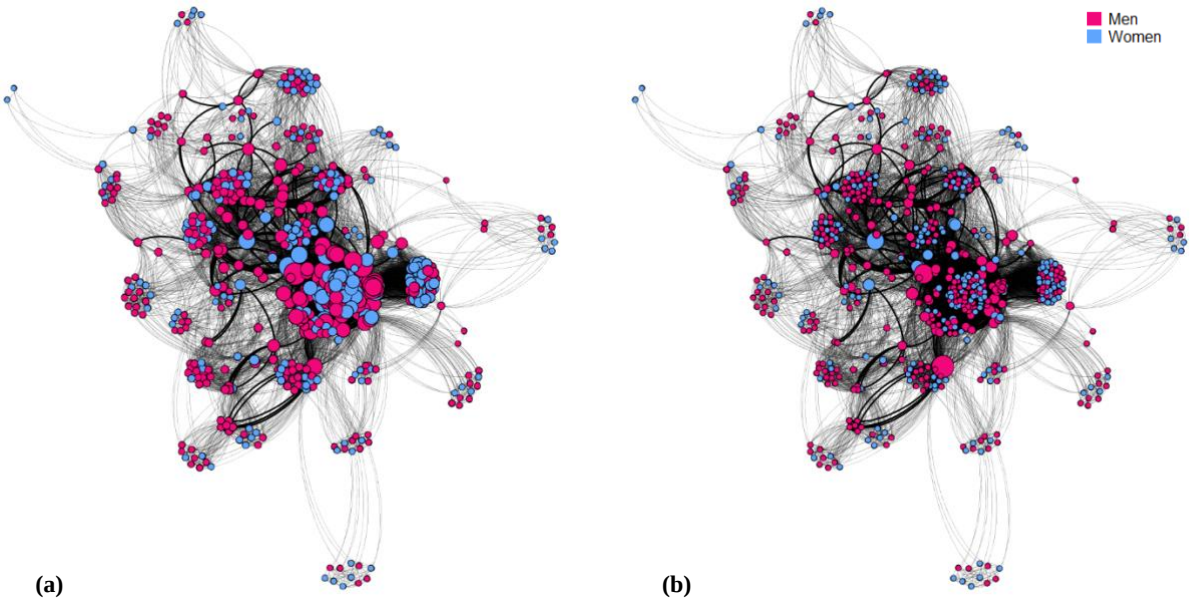


Figure 7. One-mode scholar-by-scholar network, with node colour denoting gender; node sizes are proportional to degree centrality (a) and betweenness centrality (b)

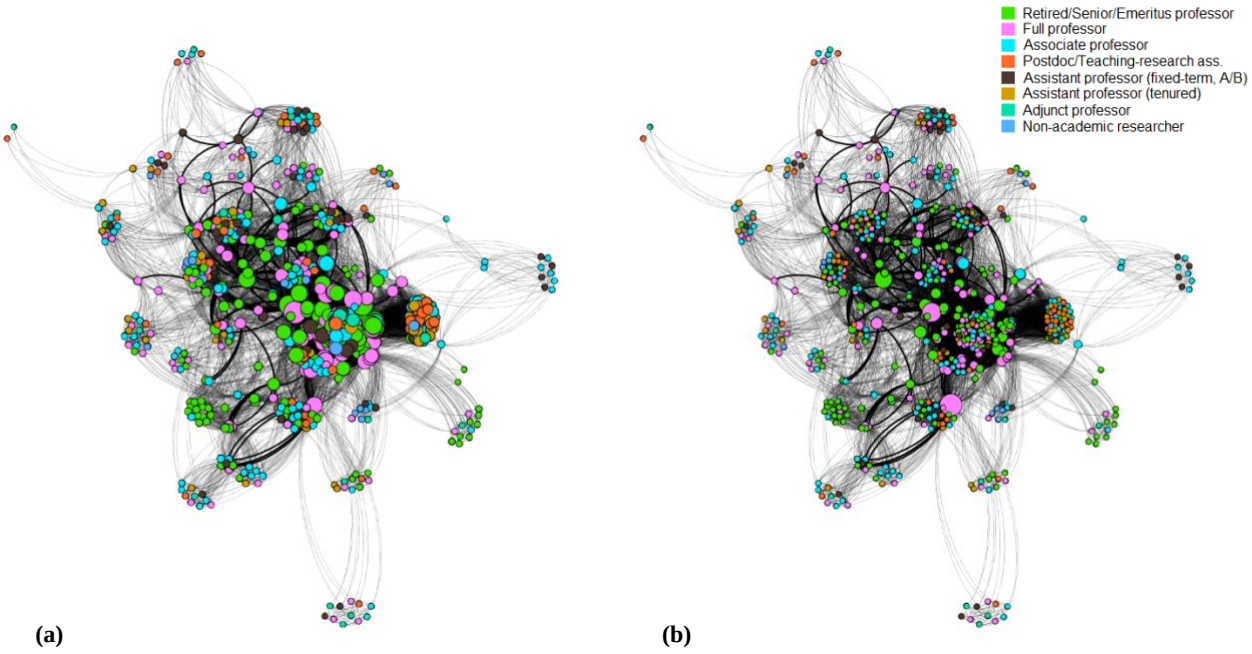


Figure 8. One-mode scholar-by-scholar network, with node colour denoting academic rank; node sizes are proportional to degree centrality (a) and betweenness centrality (b).

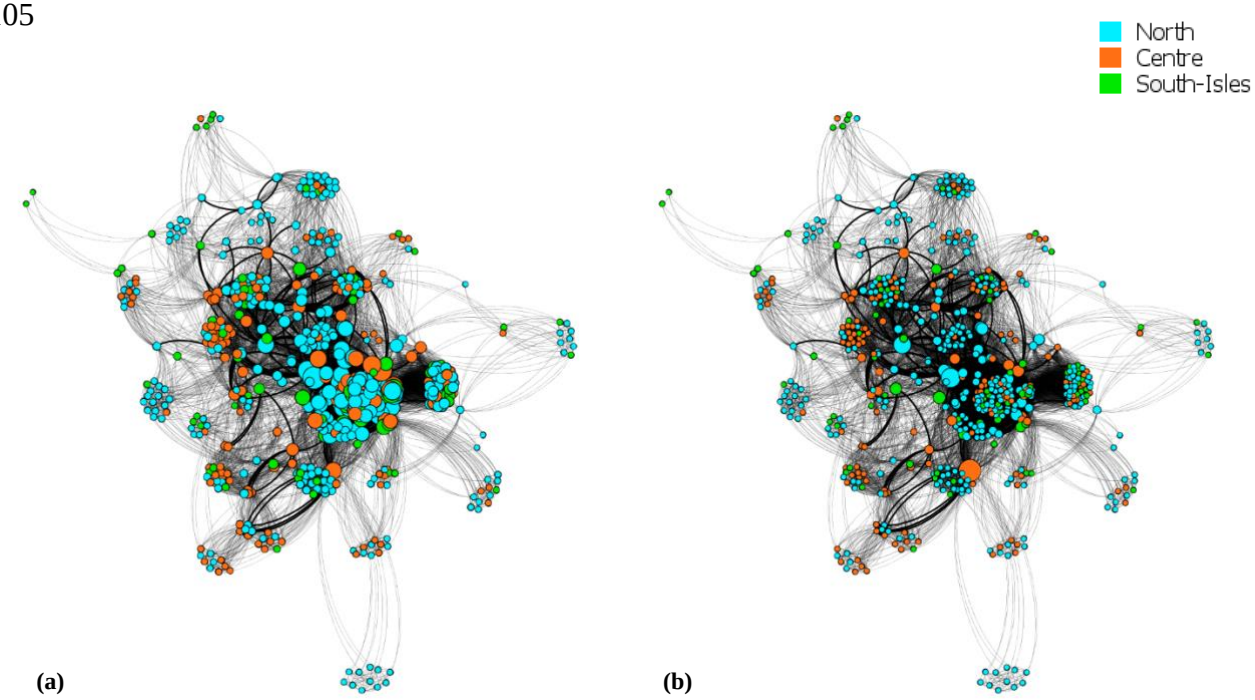


Figure 9 - One-mode scholar-by-scholar network, with node colour denoting Italy's geographical area of scholars' affiliation; node sizes are proportional to degree centrality (a) and betweenness centrality (b).

Another key point is the weight of the edges in the network, that is, the number of journal board memberships shared by any two scholars, which ranges from 1 to 4. Indeed, only 5% of all edges (*N*=17.267) have a weight comprised between 2 and 4, and only four edges (0,02%) have a weight equal to 4. Hence, the vast majority of joint memberships concerns only one journal board. In Figures 7 to 9, tie weights are visible in different parts of the graph and especially in those less dense areas around the core, where ties of weight 2 can be clearly spotted. Joint memberships in just one board constitute the periphery of the graph, while ties within the core have the highest weights. Figure 10a shows a network graph from which the ties of weight 1 have been removed, while in Figure 10b only the ties of weight 3 to 4 are visible. Furthermore, edge colour in these graphs denotes whether two scholars who are connected by a given edge share the same academic position or not (if so, the edge's colour is the same as the one denoting the position shared by the two scholars). Some joint memberships in at least two journal boards are shared by scholars holding the same academic position, although there is no evidence of homophily regarding this attribute[55]. Indeed, edges representing three or four joint memberships (0,25%) occur only between full professors and retired or emeritus professors, while extending the range to ties of weight 2 leads to include also associate and assistant professors (either tenured or fixed-term), and only two adjunct professors and one teaching/research assistant. Among those scholars who share two joint board memberships, some are located between different subsets of nodes (as noted above as well); they thus connect these subsets with one another through multiple joint memberships. Notably, these latter occur between distinguished scholars belonging to the different subsets (although other *paths* connecting these subsets are available through edges of weight 1).

[55] We calculated assortativity values for the different scholars' attributes and obtained no significant results about homophily in this respect.

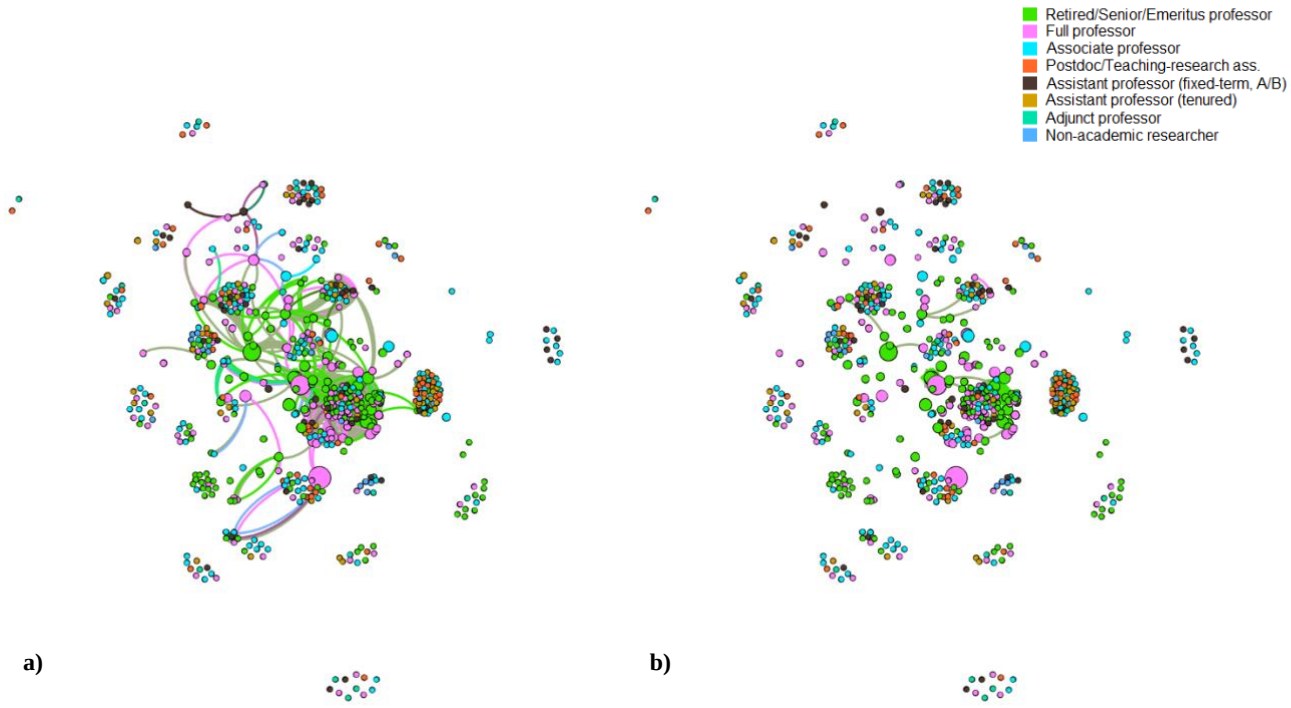


Figure 10 – One-mode scholar-by-scholar network with node colour denoting academic rank; node sizes are proportional to degree betweenness centrality. Only edges with weights ranging from 2 to 4 (a) and from 3 to 4 (b) are displayed; edge colour depends on the similarity of scholars' rank (it is of the same colour of the rank shared by two connected scholars; when the rank of the two scholars is different edge colour is mixed)

4. Discussion: board memberships and endowment of capital forms

The descriptive analyses of journal boards' composition carried out in this study helps highlight the different forms of inequality which characterize both that composition and the related network of joint board memberships. This means discussing how important are the different volumes of academic and scientific capital at the disposal of board members, and namely how these capital forms translate into symbolic and social capital. Indeed, holding board memberships in the leading Italian sociology journals under consideration is a prerogative of those who possess a higher academic capital by virtue of their rank (i.e., full or associate professors) and, to a noticeable extent, of those who hold a high symbolic capital, namely retired, senior or emeritus professors. Far more noteworthy is the amount of «capital of scientific power» deriving5from being an editor-in-chief (cf. Bourdieu, 1988), which makes the above-mentioned professors more endowed with such capital. This is, however, a form of academic and scientific power also because of the gatekeeping role played by these scholars towards potential authors of papers submitted to the journals they lead. As noted, this role is also male-dominant, which can foster gendering processes within academic networking in favour of men (Van den Brink and Benschop, 2014).

The above findings also lead to highlight how participating in different types of journal committee is not of secondary concern. In this case, inequalities are reinforced thanks to a kind of division of labour within journal boards, with less powerful figures being more often busy with management tasks without which no journal issue would be released. Instead, participation in scientific boards enriches both the symbolic recognition and the scientific capital held by the relevant members; in addition, being part of this type of board is chiefly a male prerogative and results in preserving established

positions, from which weaker figures are virtually excluded. Similarly, the power of being, at the same time, a male and a distinguished and/or established scholar goes with the one deriving from holding one or more board memberships.

The analysis of the network of interlocking editorships may also help unveil disparities that often remain unnoticed or masked within the academic research and publishing routines (Picardi, 2020; Lundine *et al.*, 2019). In particular, the network properties considered in this study are indicative of assets that scholars possess and manage in their participation in scientific activities. In this respect, scholars' two-mode (raw) degree has a clear meaning: being present in more journal boards means having a higher level of scientific activity and visibility (Cole and Cole, 1968, p. 398), but also of scientific capital (Bourdieu, 2004).

Nonetheless, in this case the most relevant capital form is social capital and, specifically, its Bourdieusian definition (Bourdieu, 1986, p. 248), since journal board memberships are no less than *memberships in groups*, even though these are not *real* groups. Whatever form of exchange board members might have with each other, they are involved in editorial activities that potentially translate into opportunities to rely upon the co-members for different scientific or academic needs and, first and foremost, to manage their own positioning within the field and/or to influence the positioning of other colleagues. This holds true for scholars' one-mode degree as well: to put it simply, «[t]he more people you have relationships with, the greater the chance that one of them has the resource you need» (Borgatti, Jones and Everett, 1998, p. 30). This social capital is, then, an added value for those positions already endowed with academic capital and/or scientific capital.

In turn, the concentration of such amount of capital forms contribute entirely to accrue one's symbolic capital. Women and less established scholars are visibly excluded from this accumulation of capital. Yet, as noted above, there are few women and fixed-term researchers who are very central in this network. For instance, as for betweenness centrality, there are more women than men among the ten most central scholars. Emphasising this result is key, given the importance of betweenness centrality for highlighting those actors who might play a bridging role in the network. Nonetheless, as emerged from research on gendering processes in science (Picardi, 2020, pp. 62-63), it has to be remarked that having a few women occupying leading positions in the social structures of academia is not good enough to foster transformations in gender disparities. In such a male-dominant network, these female scholars might have no chances of generating new female nodes. As for those fixed-term assistant professors who are very central, this may suggest that these academically young scholars are becoming emergent figures in this networked space. As regards fixed-term positions of type B, however, the above result is only a seeming exception, in that these tenure-track positions will soon translate into those of associate professors.

Another form of inequality related to scholars' centrality scores is the one concerned with their institutional affiliation. Overall, if scholars participating in journal boards work for the most part in universities located in Italy's northern or central regions, the same holds true for those scholars which are mostly central in the network examined, in terms of either degree or betweenness centrality. This issue deserves attention in future research, also considering that disparities in funding and academic staff provision occur at different territorial levels, namely not only between but also within the different regions and even with respect to diverse urban contexts.

In sum, it has to be remarked that journal boards act as systems of reputation, for they provide affiliated scholars with differential prestige and opportunity to publish their own work as well as that of their peers. For these latter, journal board members are the gatekeepers who select potential authors and publications; board members can also serve as reviewers or, at least, they can manage to suggest and/or select probable reviewers on the board's behalf. In these systems, women and less established figures are at risk of being penalised irrespectively of their non-institutional forms of academic or scientific capital – which reflect their publication record or their participation in research projects, etc. – even if some sort of co-optation or inclusion for them is at work. Actually, fixed-term researchers, postdocs or research and teaching assistants are often connected to their mentors and share journal board memberships with these latter. Although we disregarded this point in our

analyses, it might be reasonable to consider that professors create networks of "PhD siblings", with whom they share a privileged relationship» (Bühlmann *et al*., 2017, p. 514), these networks being likely embedded within those related to interlocking editorships.

One of the limitations of our work may reside in the focus upon journals that are supposed to be the leading ones, whereas other journals should also be considered in order to gain a wider vision of the field. Another weakness of the present study might be the merely descriptive purpose of our inquiry, without assessing to what extent inequalities within journal boards are interrelated or are associated with other factors. This might lead to improving our study through further quantitative or qualitative analyses. Indeed, the interlaced reproduction of inequalities within networks of journal board memberships should also be a key concern. In this respect, whilst gender inequality may be thought of as replicating the one occurring in the academia, the combination of such disparity with the one concerned with academic experience and "age", namely the amount of academic capital, and even with the differential location within the structure of these networks, does count as well. These intertwined forms of inequality may, in fact, be analysed through the lens of *intersectionality* (Crenshaw, 1991), as their intersection can further prevent disadvantaged scholars from mobilizing their assets to progress over their career paths. Future work should also address this issue.

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The gender dimension in academic and research careers: some proposals towards inclusiveness

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In the international debate, multiple reflections have recently been raised on the need to reform the selection and evaluation systems of male and female researchers (Wilsdon, 2017). The objective of these reflections is the enhancement of the diversification of human capital in research, whose potential for innovation and excellence is fundamental to addressing the current global challenges. In this new perspective moves the ongoing reworking of the principles of the European Charter for researchers, or the inclusion of the topic "research careers" in the agenda of the 2021 presidency of the European Union. Also, as announced by Jean Paquet DG for Research and Innovation of the European Commission, those institutions that do not have a Gender Equality Plan with dedicated objectives for achieving gender equality in careers will not be able to participate in Horizon Europe.
Gender inequalities in academic and scientific careers are the subject of a large international literature, highlighting the existence of two main phenomena: 1) horizontal segregation, consisting of the under-representation of women in some areas of knowledge, in particular in STEM and 2) vertical segregation, that is, under-representation in the top positions of the academic career (glass ceiling) and overpopulation and stagnation in the lower ones (through the *sticky floors* - "floors that glue" which cause the professional advancement of women proceed more slowly). A phenomenon more recently highlighted (Picardi 2019, Gaiaschi and Musumeci, 2020) and peculiar to the Italian academy concerns the adverse selection of women entering the first structured positions, with the introduction, by the Law 240/2010, of the figure of the RTD and its differentiation in a position with tenure track and one without: in many disciplinary sectors among the recruited RTD-B women are less numerous than men compared to what happens among the RTD-A (*Glass door*, Picardi, 2019).
Starting from the identification of the main existing barriers, this document aims to propose lines of action that can affect vertical segregation, indicating actions aimed at addressing the mechanisms that penalize female careers in academia and research. In fact, as Elisabetta Addis recalled, "excellence is not a variable given in nature, which only needs to be measured, and who are excellent men and women depends on the relationships between the sexes in the scientific community and in society. It is possible to work to change the judges, and above all to adopt different selection criteria and different parameters" (Addis, 2008).

1. Barriers

Already in the San Francisco Declaration of 2012, DORA, now relaunched and endorsed by thousands of universities and research institutions around the world, some persistent myths (Hatch and Schmidt, 2020) were identified in the evaluation of research and in the selection of researchers and of female researchers, who act as barriers to the full realization of gender equity in careers, primarily for women. We remember among these:

- Hiring, promotion, and tenure decisions are largely made on merit. When applications are high, it is difficult for evaluators to distinguish the top candidates without resorting to unconscious biases, such as the halo effect or gender bias.

- JIF and other similar journal-based indicators measure research quality. JIF are overall measures to be applied to journals, they do not provide timely information about individual articles or researchers. The same applies to the practice of assessing applicants on the number of publications, regardless of the type of publication, the number of authors or their role in the article.

- Assessment practices will naturally improve over time. Based on the available data, it is estimated that significant improvements will not be achieved for three generations. Many aspects that characterize academic work are not taken into account during assessment as well as the fact that caring work, which does not affect research skills and is necessary for the optimal functioning of society, is still strongly borne by women while penalized by any form of intensive assessment of research.

In particular, the belief that there is a dichotomy between achieving equity and excellence, in recent years also generated by the ambiguous use of bibliometrics in evaluations (Bhalla, 2019), must be eradicated. While bibliometrics appears to reduce evaluator discretion and thus also reduce bias due to gender stereotypes or discrimination, the choice of indicators to be used is never neutral, and can lead to direct or indirect discrimination: for example there are obvious differences in age (think of h-index), number of authors, topic (think of mainstream versus frontier and interdisciplinary research), but also less obvious a priori differences based on gender, in particular on the number of publications and the resulting number of citations (Larivier et al., 2013). In Italy these differences are reflected, for example, in the ASN and VQR indicators (Montorsi, 2019) with a further attention: the repeated application of criteria with even small gender differences can lead to strong biases over time (Addis, 2008).

In this context, gender differences are indicative not only of a different way of working, but also of a greater burden on women of care work. The latest example is the ongoing COVID-19 pandemic, which, by forcing people to work from home, is showing how having caregiving responsibilities, especially with young children, is time-consuming and affects the scientific productivity of researchers and especially female researchers (Myers et al., 2020; Fazackerley, 2020; Kitchener, 2020). On the other hand, the implications of care work which, as is known in Italy, falls mainly on women (Naldini and Saraceno, 2011; Naldini, 2015), can also be beneficial for academic work. The experience of motherhood can in fact allow to develop and strengthen important soft skills at work – such as creativity, leadership, relational (empathy and listening) and organizational (multitasking and problem solving) skills – which should be recognized within evaluation processes (Vitullo and Zezza, 2014; Erkut, 2001; Erkut, 2006; Crittenden, 2004).

More generally, imbalances and inequalities between men and women in academic and research institutions are the result of a complex intertwining of cultural, structural and institutional factors

operating at multiple levels, e.g., individual, organizational, and regulatory (Bozzon et al., 2017; Solera and Musumeci, 2017).

2. Areas of interventions

Policy proposals aimed at achieving greater gender balance in careers at academic and research institutions should aim to act on intertwining of factors listed above. Therefore, they can be carried out both at the level of individual universities, where the role of leadership and internal practices within individual organizations is important in fostering change, and at the national level by identifying and removing obstacles, including legislative ones. In this respect, the Italian situation highlights the need to rethink some aspects of the legislation, if not formally in substance, at least finding room for maneuver-in existing legislation.

Also in the light of the following documents already drawn up on the subject:

- National Conference of Equality Bodies of Italian Universities: proposals to Minister Bonetti (January 2020),

- National Conference of Equality Bodies of Italian Universities: proposals to MIUR (2019) regarding access to calls for funding of research projects (in particular PRIN calls) and maternity leave. Fixed-term researchers of type B (RTDB),

- National Conference of Equality Bodies of Italian Universities: "Guidelines for University Gender Balance" (2017) - available at http://www.cpouniversita.it/?page_id=127,

- MIUR Working group coordinated by Elisabetta Addis (2018): "Indications for positive actions of the MIUR on gender issues in the University and in research" - available at the page https://www.miur.gov.it/-/parita -of-gender-in-universities-and-research-institutions-presented-to-the-miur-the-dedicated-document,

- CRUI - Commission for Gender Issues_Gender Budget Working Group (2019): "Guidelines for Gender Budgeting in Italian Universities" - available at https://www2.crui.it/crui/Linee_Guida_Bilancio_di_Genere_negli_Atenei_italiani.pdf, pp. 68 and ss.,

- CRUI - minutes of the meeting of May 16, 2019,

it is proposed that the competent institutions intervene with policies and actions aimed at fostering equity and gender balance in university careers, in particular in the following areas.

1) Balanced gender representation:

- in collegiate and decision-making bodies, and in all governance roles of the universities,

- in competition and assessment committees,

- in the various degrees of the career,

- in the coordination and teams of research projects;

2) Evaluation:

- of researchers, female researchers,

- of structures,

through a rethinking of the evaluation criteria that aims at a transition from the evaluation of a few parameters given a priori, to a multidimensional evaluation shared with the individual / the structure during the evaluation process;

3) Research and training on the gender dimension:

- supporting research on gender dimension in research and academia and on mechanisms that reproduce inequalities in research and academia,

- awareness raising and training on the gender dimension and mechanisms that reproduce inequalities in research and academia;

4) Resource allocation for gender equity:

- to support at institution the policies of gender equity in staff careers, and those of reconciliation and environmental well-being,

- to foster shared interpretation of the tools at a national level, including through the role of equality bodies;

5) COVID-19, adoption of ad hoc measures:

to support the categories most sensitive to the effects of the pandemic crisis, such as staff with young children / elderly parents, staff who have had health problems.

Below we identify some proposals for each of the above areas.

3. Proposal

In order to share and implement the proposals below, it is first of all necessary to reactivate the permanent collaboration table between the Ministry of Equal Opportunities, the Ministry of University and Research (MUR), the National Conference of Equality Bodies of Italian Universities, and to extend it to other players on the issue, such as the CRUI Gender Commission, or ANVUR as for the analysis and implementation of policies on the gender dimension in careers and evaluation of research and researchers.

1) Balanced representation of genders:

- Introduction, among the indicators linked to the awarding of funds to universities, of indicators related to gender equity, in particular as regards the recruitment and careers of personnel and the composition of governance,

- Extension to university Boards of Directors and public research institutions of the legislation regarding the gender composition of investee entities,

- Double preference mechanism in elective type bodies,

- Gender equity in competition committees with the possibility of teaching/research relief for overburdened members,

- Gender equity in the coordination and research teams of funded projects; for example, by making explicit in the call for proposals related reward measures,

- Implementation of mechanisms for rebalancing in careers, such as “cascading” processes in promotions: the presence of a gender in the next grade should mirror that of the previous grade, with particular attention to tenured positions at entry and senior levels, and in governance,

- Introduction of measures to support gender balance positions of responsibility of technical, administrative, and library staff.

2) Research assessment:

- Identify human capital diversification goals prior to the evaluation process, for example by specifying in the calls that applications from women and / or other under-represented groups are considered with particular attention,

- Promote multidimensionality and variability of indicators for evaluation, chosen by the researcher or by the structure when submitting application,

- Peer review of works selected by researchers for individual evaluation, already at the time of qualification,

- Enhancement of teaching, organizational and third mission activities, as well as work done in favor of gender equity, already in the qualification process,

- Enhancement of the care activity, already at the qualification stage,

- Introduction of an 18-month corrective for all forms of assessment over defined periods of time, on the model of the European Research Council (ERC), so that equal rights are recognized and guaranteed in the scientific career of women who choose to also be mothers, allowing fair access to funding for research projects that identify age constraints (eg. Principal - youth line), and in all evaluations (eg. ASN where currently the standardization of indicators is carried out considering only the months of maternity leave actually taken); and of corrections equal to the family / paternity leave actually used in the other cases.

3) Research and training on the gender dimension:

- Transparency and availability of gender-disaggregated data held by MIUR, for example also on number of received applications and the outcomes of ASN, or on VQR, also with respect to role, number of children, membership structure, etc.

- Requirements for Universities and Research Institutions which, starting from the collection and dissemination of data from a gender perspective, provides for planning in a gender perspective integrated into the University governance documents, as well as for allocating the corresponding human and financial resources. Incentivize the universities and research organizations so that the time dedicated to these activities by university staff is recognized and that they are adequately trained,

- Training, held by experts on the subject, of all staff (teachers and researchers, university governance, PTA, ...) and of students to increase awareness of gender imbalances in academic careers and knowledge of what may be the mechanisms and factors that determine them outside and inside the academic organization. Provision should be made for the recognition of the time dedicated by those who participate in training activities in the form of CFUs or provide for this within the Institution's Training Plans with recognition of the time dedicated to it by those who take part,

- Training on unconscious biases for committee members (for profit exams, hiring and promotion, etc.),

- Raising awareness of the positive effects of a balanced organization of work from a gender sensitive perspectives and attentive to work-life balance.

4) Allocation of resources for gender equity:

- Support for gender rebalancing policies in different roles: for example, rewards for institutions that have a gender equality plan with specific gender equity objectives ~~o~~ in careers, through one or more specific indicators in the three-year strategic programming (PRO3), FFO, ...

- support for policies of reconciliation of life and work times, equal opportunity policies, and third mission activities related to gender: for example, by rewarding institutions that have a gender budget; through adequate financial support for international mobility of staff with accompanying families; through the provision of dedicated human resources in the staff,

- support for environmental well-being policies, for example through resources to be allocated to upgrading work on university facilities, planned with attention to the needs of all staff

- training, mentoring experiences – including at external agencies – to promote female careers of administrative and technical staff: for example, by providing skills in management, human resources management and leadership, elements of economic and financial planning and management, communication and management of labor relations.

5) COVID-19, adoption of ad hoc measures

- Grants to support teaching and research by recruiting staff who can assist teachers and researchers in various activities according to specific needs, for example: teaching tutoring to support the study path of teaching students, collaboration in the preparation of visual and digital course materials, participation in exam sessions, tutoring activity for dissertations, desk research, text editing, etc.,

- Economic resources for encouraging mobility for researcher with children, and to support the costs of summer camps and babysitting services,

- Support for staff with family health emergencies.

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