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Overcoming Glass Ceilings, Glass Doors and Bottlenecks: Female Recruiting and Progression in Italian Political Science

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Abstract

This article examines gender inequality in Italian academia, focusing on Political Science (SPS/04) compared with the broader Area 14 (Social and Political Sciences) and General Sociology (SPS/07), between 2005 and 2020. The period allows an assessment of changes over time, especially after the Gelmini reform (law 240/2010) and restrictions on turnover. Using original datasets and segregation indexes, we trace women's representation across academic career stages. Political Science shows persistent gender imbalance from the outset: women are underrepresented among postdocs and junior assistant professors (RTDA), and this disadvantage carries forward through the entire career ladder. By contrast, Area 14 shows stronger feminization at entry with women forming the majority among postdocs and nearing parity at RTDA, but faces sharper barriers at promotion, particularly to full professorships. General Sociology follows yet another pattern: women dominate at entry and are close to parity at mid-career, but their presence declines at the top. These findings highlight distinct configurations of gender inequality in Italian academia.

1. Introduction

The issue of women's underrepresentation in academia was first raised in the United States in the mid-1960s, notably through feminist sociologist Alice Rossi's seminal article *Why so Few?* (1965), which highlighted the challenges women were facing in accessing and remaining in science. However, it was not until at least the 1990s that the topic gained significant relevance in both the US and Europe, leading to a series of initiatives aimed at promoting the presence of women in research and academia, especially in STEMM (science, technology, engineering, mathematics and medicine) fields. These efforts were framed not only as a matter of social justice but also as a matter of efficiency, given the considerable waste of human capital within the university system. At the time, the question 'Why so few?' was paralleled by the question 'Why (has improvement been) so slow?' (Valian 1999). Today, these questions remain unchanged, concerning both the phenomenon of horizontal segregation, namely the low number of women accessing some scientific fields, and vertical segregation, which

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refers to women's slower career advancement and their scarce presence in top positions (i.e. Naldini & Poggio 2023).

In Italy the debate gained clear relevance especially after the 2010 university reform (L. 240/2010), also called the Gelmini reform. For several years, the issue remained a hot topic due to the cumulation of two different processes: firstly, the cuts in recruitment with the freezing of turnover from 2007 to 2017 and secondly, the precarization of the role of assistant professor (*Ricercatore*) set forth by the Gelmini reform itself.

So far, the research on gender inequalities in academia in Italy has focused on the whole academic population comprising all fields, or, at most, by comparing macro fields such as, on the one hand, the Social Sciences and Humanities (SSH) and, on the other, the STEMM disciplines (Murgia & Poggio 2019; Picardi 2019; Gaiaschi and Musumeci 2020; Filandri & Pasqua 2021; Naldini & Poggio 2023). However, there is still scarce knowledge regarding the presence of women across different fields and sub-fields, despite some recent exceptions related to the sub-field of Political Science (Bosco & Feo 2024, Marino 2023; Bolgherini & Verzichelli 2023). Recent data show that the picture is far from homogeneous in both STEMM and SSH (Gaiaschi 2022 and forthcoming). According to the Ministry of University and Research's (MUR) classification of academic scientific fields[1] substantial differences persist across these fields. Within STEMM, the rate of women, considering all career positions from postdoc to full professorship, ranges between 56.2% in Biology (Area 05) and 23.5% in Industrial and Computer Engineering (Area 09), which is the least feminized field (2020 data). Among the SSH fields, Ancient, Philological-Literary and Historical Art Sciences (Area 10) is the most feminized field (55.6% of women) in the whole academic population, while the women's rate substantially decreases to 40% in the field of Law (Area 12). Moreover, such a picture can change considerably across the different positions of the career ladder. On this point, the use of indexes accounting for the different forms of vertical segregation – for example the *Leaky Pipeline Index* or the *Glass Ceiling Index* – can be useful. Indeed, the loss of female personnel between the first and final career stage (Leaky Pipeline Index) is particularly strong in Medicine (Area 06), among STEMM fields, and Political and Social Sciences (Area 14), among SSH. In addition, the proportion of female full professors is lower than the proportion of women in the general population (Glass Ceiling Index) particularly for Physics (Area 02), Earth Sciences (Area 04), Medicine (Area 06) and Industrial and Computer Engineering (Area 09) among STEMM and in Political and Social Sciences (Area 14) among SSH (Gaiaschi 2022, p. 148).

Against this background, the aim of this article is to highlight gender inequalities in academic careers, particularly in Political Science, as this seems to be a sub-field where improvement is particularly slow among SSH. The sub-field Political Science (which, in

[1] The 14 scientific fields identified by the MUR are: Mathematical and Computer Sciences (Area 01); Physical Sciences (Area 02); Chemical Sciences (Area 03); Earth Sciences (Area 04); Biological Sciences (Area 05); Medical Sciences (Area 06); Agricultural and Veterinary Sciences (Area 07); Civil Engineering and Architecture (Area 08); Industrial and Information Engineering (Area 09); Ancient, Philological, Literary and Historical-Artistic Sciences (Area 10); Historical, Philosophical, Pedagogical and Psychological Sciences (Area 11); Legal Sciences (Area 12); Economic and Statistical Sciences (Area 13); Political and Social Sciences (Area 14). Each of these fields is divided into several sub-fields. Fields and sub-fields were reformed in 2022. Given the time frame under analysis, the data used for this article are not affected by the change in the nomenclature.

the above-mentioned MUR classification, is coded as SPS/04) will be compared, at a higher level, to the whole academic population and to the broader field of Political and Social Sciences (Area 14), to which political scientists belong, together with sociologists, political historians and political philosophers. Within area 14, the sub-field of General Sociology (SPS/07) has been chosen as a further point of comparison due to its relative proximity and size.

The paper is structured as follows: section 2 recalls the theoretical debate on the gender gap in academia focusing on macro-level explanations, while section 3 provides some insights into the Italian University context. In section 4 we describe the dataset and the methods, and sections 5 and 6 give an account of empirical findings through descriptive statistics and the use of indexes. In the conclusion (section 7) we summarize the main findings and briefly discuss some possible solutions for promoting gender equality in academia and research.

2. The gender gap in academia: an overview of the literature

Notwithstanding the progressive advance of women in academia, gender inequalities still persist both in terms of horizontal segregation, namely the uneven gender distribution across scientific fields (Rossi 1965; Valian 1999; Palomba 2012), and vertical segregation, namely the low and slow feminization of the highest positions in academia. Indeed, an increasing number of contributions (among others: Sabatier & Carrere 2010; Van den Brink & Benschop 2012; Box-Steffensmeier et al. 2015; Marini & Meschitti 2018; Filandri & Pasqua 2021; Durodoye et al. 2020) have shed light on the so-called glass ceiling, which is the existence of an invisible barrier located at the top of an academic career, preventing women from becoming full professors or principal investigators. Further contributions (Gaughan & Robin 2004; Perna 2005; Wolfinger, Mason, & Goulden 2008; Bozzon, Murgia & Villa 2017; Murgia & Poggio 2018) have also focused on intermediate and early positions, showing that obstacles for women are not limited to the top of the career ladder but are present throughout their entire academic career path, including early positions. In particular, some research has pointed out how women in academia are particularly concentrated in lower and non-tenured positions and that they are more likely to leave the academic labour market than men (Alper 1993; Bozzon, Murgia & Villa 2017; Le Feuvre et al. 2019).

The literature has investigated the manifold reasons at the base of such inequalities, including gender differences in care and domestic work, in scientific production, in access to research funds, or discrimination due to unconscious gender biases. However, an efficient way to disentangle the whole debate is to divide between supply- and demand-side explanations (Carriero & Naldini 2022; Gaiaschi 2021). Supply-side approaches focus on gender differences in individual characteristics, namely gender differences in care responsibilities (see for example: Sax et al. 2002; Fox 2005; Heijstra, Bjarnason & Rafnsdottir 2015), in mobility and collaborations (Bozeman, Fay & Slade 2013; Beaudry & Larivière 2016) and self-promotion, namely the fact that women are less likely to take on leadership positions (Bosak & Sczesny 2008), also because they reshape their career aspirations with the awareness of working in a gender-unequal environment (Kelly & Grant 2012). Lastly, an important strand of literature has shed light on gender differences in scientific productivity with a specific focus on the structural determinants of

such differences (e.g. Abramo, D'Angelo & Caprasecca 2009; D'Amico, Vermigli & Canetto 2011; Van Arensbergen, van der Weijden & van der Besselaar 2012).

Turning to demand-side approaches, they point out the existence of gender biases, both at the individual (i.e. from employers) and organizational level, that generate discrimination in recruitment and promotion processes (Bagues, Sylos-Labini & Zinovyeva 2017; Checchi, Cicognani & Kulic 2019; Gërxhani, Kulic & Liechti 2023). Several contributions have shown how scientific excellence is framed by gender stereotypes that systematically disadvantage women (Addis & Villa 2003; van den Brink & Benschop 2011; Lund 2015). Others have focused on barriers and resistances to the application of gender equality policies inside academic institutions (Lombardo & Bustelo 2021; Verge 2021). Finally, more 'structural' approaches have focused on the role of networks and homophily, with men benefiting from their higher social capital within university institutions (Beaudry & Larivière 2016), as well as on forms of subtle segregation within scientific organizations, with women more concentrated in service and teaching, which are less rewarded in terms of career progression (Winslow 2010).

More recently, other demand-side studies go beyond the micro (or individual) and meso (or organizational) levels of explanation to focus on the institutional level that pertains to the reforms of the academic system as a whole (macro level). In this regard, numerous contributions have explored the gendered implications of recent 'neoliberal' transformations of university institutions, focusing on the effects of the 'meritocratic ideal' and the precarization of work due to cuts in public expenditure for higher education (Riegraf et al. 2010; Van den Brink & Benschop 2012; Ferree & Zippel 2015; Bozzon, Murgia & Villa 2017; Murgia & Poggio 2019; Gaiaschi 2023). This latter perspective has been chosen over other approaches.

Our research questions can basically be divided into two subgroups, the first being related to the problem of horizontal segregation: are there still fewer women than men in Italian academia more in general, and in the Social and Political Sciences field (Area 14) more specifically? Moreover, is the trend of the sub-field of Political Science (SPS/04) consistent, or not, with the broader Area 14? Are there differences from and similarities to the sub-field of General Sociology (SPS/07)?

The second block of our research questions relates to the problem of vertical segregation and thus whether it is still so hard for women to climb the academic ladder. This problem can be unpacked into other questions: does the gender gap only persist in the final position of full professorship, or is the gender gap to be found at all other career steps? As a consequence, by comparing the sub-field of Political Science (SPS/04) with the broader Area 14 and the sub-field of General Sociology (SPS/07) this paper focuses not only on the disadvantage of women in the final career stage but also at the early and mid-career steps, i.e. in the transition from the position of assistant professor to that of associate professor and in access to tenure-track positions.

The main expectations based on the literature relate to both forms of segregation. On the one hand, previous research has shown that political science has long been a highly male-dominated sub-field, with women having a marginal presence until the 1990s (Graziano 1986; Morlino 1989). Moreover, women have remained underrepresented in subsequent decades (Bosco & Feo 2024). Therefore, we expect female political

scientists to be underrepresented in all positions compared to the wider Area 14, especially in the top position of full professorship (Bolgherini & Verzichelli 2023).

On the other hand, previous studies (Picardi 2019; Gaiaschi & Musumeci 2020; Guarascio, Musumeci & Villa 2023), suggest that the gender gap among assistant professors increased after the 2010 Gelmini reform, especially for the RTD B position. Consequently, we also expect that since 2011 the situation has worsened for female assistant professors in the SPS/04 sub-field as well, especially for the RTD B position, as has occurred in other fields.

Additionally, we expect that the freeze in turnover may have stronger negative effects for women and so it may have slowed down female recruitments at all levels, including for associate and full professors. At the same time, the end of the freeze in 2017 should have contributed to an amelioration in the rate of women across all positions, as previous literature has suggested (Gaiaschi & Musumeci 2020). Thus, we expect an amelioration in the feminization of such positions after 2017 in the SPS/04 sub-field as well.

3. Italian university transformations: towards a market-oriented approach

From a macro-level perspective, Italy is an interesting case in point because it has experienced various processes of change related to organizational and financial reforms involving the public university system as a whole since the mid-2000s (Capano 2011 and 2020).

The reorganization of the Italian university system began in 2005 with the Moratti reform (law 230/2005), which put an end to the role of permanent assistant professor (RU) and introduced fixed-term assistant professors (*ricercatore a tempo determinato* in Italian, or RTD) for the first time. However, the idea that research could be entrusted mainly to temporary staff was the key to the subsequent 240/2010 law (Guarascio, Musumeci & Villa 2023).

In 2010, the so-called Gelmini reform (law 240/2010) further strengthened this approach by introducing two new types of assistant professor position: a junior (non-tenured) assistant professor, also called RTDA, based on a three-year fixed-term contract (renewable once for two more years), and a senior (tenure-track) assistant professor, also called RTDB, based on a three-year non-renewable fixed-term contract reserved for those who had previously held an RTDA position or had other postdoctoral experiences, with the possibility of becoming associate professor after obtaining the National Scientific Qualification[2], and after receiving a positive local evaluation from their university[3].

[2] The National Scientific Qualification is an evaluation process introduced by the 240/2010 Law managed by the Ministry of University and Research (MUR) awarding a qualification based on standard metrics of individual performance that academics need to hold when applying for the positions of associate and full professors.

[3] In 2022, a unique position of fixed term tenure-track assistant professor (also called RTT) was introduced, with a contract length of a maximum of 6 years instead of the existing RTDA and RTDB. Being comprised between 2005 and 2020, the data used for this article do not include this type of position, whose very first contracts were implemented in 2023.

While the 2005 reform was mainly aimed at reducing University research funding and staff turnover, the 2010 reform's objectives were certainly much broader. From this point of view, the redesign of the early-steps academic positions undertaken by the 240/2010 law was part of wider structural and cultural changes inspired by the New Public Management (NPM) principles of competitiveness, effectiveness and efficiency, in the context of profound transformations that had also affected other European countries in previous years.

The NPM principles led to three lines of change that justified a series of financial policies from 2007 to 2017 aimed at cuts and turnover freezes. These were: the institutional autonomy of public universities; the evaluation of the quality of research of individuals (through, for example, the introduction of the National Scientific Qualification) and organizations (through the 'Research Quality Assessment', in Italian *Valutazione della Qualità della Ricerca* or VQR, see below), as well as the introduction of competitive funding mechanisms based on results (Regini 2014).

In a first phase, from 2008 to 2012, the Italian university system was squeezed by a sharp reduction in its overall funding, which is guaranteed by the Ministry of University and Research through the so-called Ordinary Financing Fund (FFO) (Viesti 2016), and the consequent, prolonged restrictions on turnover that significantly reduced the number of teaching staff. As pointed out by Zamponi and Gonzales (2019), these cuts are widely considered to be one of the earliest manifestations of austerity/anti-austerity cycles. In particular, following the approval of Law 133/2008, 'state funding for public universities was cut by 63.5 million euros in 2009, 190 million euros in 2010, 316 million euros in 2011 and 417 million euros in 2012' (Ibidem, p. 5).

In a second phase (2012-2016), which paralleled the implementation of periodical evaluation mechanisms of University and Department research quality (through the above mentioned Research Quality Assessment) in order to better allocate resources, the funding cuts were maintained and continued. For example, there was a further cut of €455 million in 2013. Furthermore, the implementation of such evaluation processes resulted in an increasing territorial differentiation of state funding (FFO) allocation, entailing increasing differences in the capacity of universities to hire new personnel or grant career progression. Hence, there are now greater staff turnover disparities between universities.

Since 2017, funding for universities has again begun to grow in nominal terms, but this is mainly due to the provision of extraordinary funds (mainly for recruitment), a circumstance that does not guarantee future funding. Staff turnover has returned to 100 percent, but still varies between universities, taking into account that an increasing proportion of the teaching staff is non-permanent.

In 2021, 8.55 billion euro of PNRR funds were earmarked for research and development. However, most of these resources have been invested in a variety of pre-role measures, such as the creation of temporary post-doc positions (in Italian *assegni di ricerca*), RTDA positions and PhDs.

Finally, in 2024, the right-wing Meloni government cut €500 million from the FFO — one of the largest cuts since 2013 — which would seem to usher in a new era of retrenchment.

Against this background, this paper aims to understand changes over time in the presence of women on the academic ladder, with a particular focus on the implications, for women, of macro-level processes, namely the turnover freeze due to financial cuts and the precarization of early-career positions. The analyses will be carried out on the sub-field of Political Science, in comparison with the broader field of Political and Social Sciences (Area14) and with the sub-field of General Sociology (SPS/07).

4. Data and Methods

In this paper we rely on an original dataset including the number of employed academics as of 31 December of each year in the period 2000-2020 (with the exception of the data on post-docs which start in 2005), by gender[4], qualification, geographic area, scientific field and sub-field in Italian public and private universities. More specifically, the timeframe varies according to the position. Broadly speaking, the starting point is the year 2000 for pre-reform assistant, associate and full professors, 2005 for post-docs and 2011 for the post-reform assistant professors. As a consequence, the timeframe covered by our dataset does not allow us to capture the effect of PNRR funding, nor the most recent cuts. Data were provided by the statistical office of the Ministry of Research and University (MUR previously MIUR) under the aegis of the WIRED project[5]. Differently from other publicly-available, open-source datasets[6], the one used for this article comprises micro-data on post-docs (in Italian *assegnisti di ricerca*) over time. Their presence is innovative compared to other studies on the Italian academic population as it allows us to seize the trends of early-career positions over time and construct indexes of vertical segregation accounting for the whole career trajectory.

The professional qualifications to which the data refer are: full (*professore ordinario* or PO) and associate (*professore associato* or PA) professors, pre-Gelmini reform permanent assistant professors (*ricercatore universitario* or RU), type A or 'junior' and type B 'senior' fixed-term (post-Gelmini) assistant professors (*ricercatore a tempo determinato* or RTDA and RTDB for junior and senior respectively), and post-docs (*assegnisti di ricerca* or AR) . The data are divided into fields (*area scientifica*) and sub-fields (*settore scientifico-disciplinare* or SSD), as they are identified by the National University Council (CUN).

The data were analysed by means of descriptive statistics, such as frequency distributions, averages and percentage changes, as well as by means of vertical segregation indexes, including the glass ceiling index (European Commission 2024), the glass door index (Picardi 2019) and a recently introduced index called the bottleneck index (Gaiaschi & Musumeci 2020).

[4] Unfortunately, the data provided do not allow us to identify non binary or transgender individuals. We are aware of the fact that this is a limit hampering data inclusivity as well as the accuracy of these analyses.
[5] WIRED – Women In Research and higher EDucation (GA 898507, PI: Camilla Gaiaschi), EU Horizon 2020 MSCA-IF.
[6] See https://cercauniversita.mur.gov.it/ include and https://ustat.mur.gov.it/opendata/. The former includes micro-data on the academic population but it lacks information on post-docs over time. The latter has time-series data, including on post-docs, but on an aggregated level and with very limited information.

The Glass Ceiling Index (GCI) has been used both at the institutional level (OECD 2015; European Commission 2024) and, more recently, at the academic level (Picardi 2019) to measure female under-representation in the top positions of the academic career ladder, that is, among full professors. In the well-known She Figures report, the European Commission defines the GCI as the ratio between the proportion of women in grades A, B, and C of their academic career in a given year [PW (a + b + c), Y] and the proportion of women in grade A in the same year [PW (a), y] (European Commission 2024). Grade A corresponds to full professor and grade B to associate professor (European Commission 2024). On the contrary, the definitions of grade C change from country to country, thus implying difficulties – recognized by the Commission itself – of cross-country comparisons. According to the Organisation for Economic Co-operation and Development definition (OECD 2015), which is used in the She Figures report, grade C includes both assistant professors and post-docs. According to the MIUR definition, which is the definition adopted in this work, grade C includes only assistant professors (pre-reform RU and post-reform RTDB and RTDA), while post-docs are included in grade D (if the MIUR definition is adopted, the GCI equation changes as it coherently reports, in the nominator, grade D as well).

Therefore, the GCI reported in this work is calculated as follows:

$$GCI = \frac{\%W(a+b+c+d);Y}{\%W(a);Y}$$

that is, as the ratio between the proportion of women in grades A, B ,C and D of the academic track [%W(a+b+c+d), Y] and the proportion of women in grade A in a given year [%W(a), Y].

The GCI measures the disadvantage women experience at the top of the career ladder. As such, it does not allow gender inequalities to be measured across the previous steps of the career ladder, namely in the transition from D (post-doc) to C (assistant professor) level, and from C (assistant professor RU, RTDB, RTDA) to B level (associate professor, PA).

The first issue has been addressed by Picardi (2019) with the Glass Door Index (GDI), which measures the under-representation of women in access to assistant professor positions, and it is calculated as follows:

$$GDI = \frac{\%W(c+d);Y}{\%W\ (c);Y}$$

that is, as the ratio of the proportion of women in grades C (assistant professors) and D (post-docs) of the academic career in a given year [%W(c+d), Y] to the proportion of women in grade C (assistant professors) in the same year [%W(c), Y].

In her article, Picardi considers only tenured or tenure-track assistant professors, that is, respectively, the RU for the pre-reform years and RTDB for the post-reform years. In this article, we calculate the GDI following this approach. In addition, we calculate the GDI also considering, for the post-reform years, both tenure-track or 'senior' (RTDB) and non-tenure-track or 'junior' (RTDA) positions of assistant professor.

The second issue was addressed by Gaiaschi and Musumeci (2020) with the Glass Bottleneck Index (GBI) which is inspired by the metaphor of the middle-level bottleneck

used in management studies (Yap & Konrad 2009). The GBI measures the gender gap at mid-career, i.e. in the transition from the position of assistant professor (RU, RTDB, RTDA) to that of associate professor (PA).

The Glass Bottleneck Index (GBI) is calculated as follows:

$$GBI = \frac{\%W(b+c);Y}{\%W\ (b);Y}$$

that is, as the ratio between the proportion of women in career grades B and C [%W(b+c), Y] and the proportion in grade B [%W(b), Y].

An index greater than one indicates that women are under-represented among full professors (in the case of the GCI), associate professors (in the case of the GBI), or among assistant professors (in the case of the GDI). The higher the index, the greater the disadvantage.

5. Women across career stages: comparing Political Science, the wider field of Political and Social Sciences, and the sub-field of General Sociology

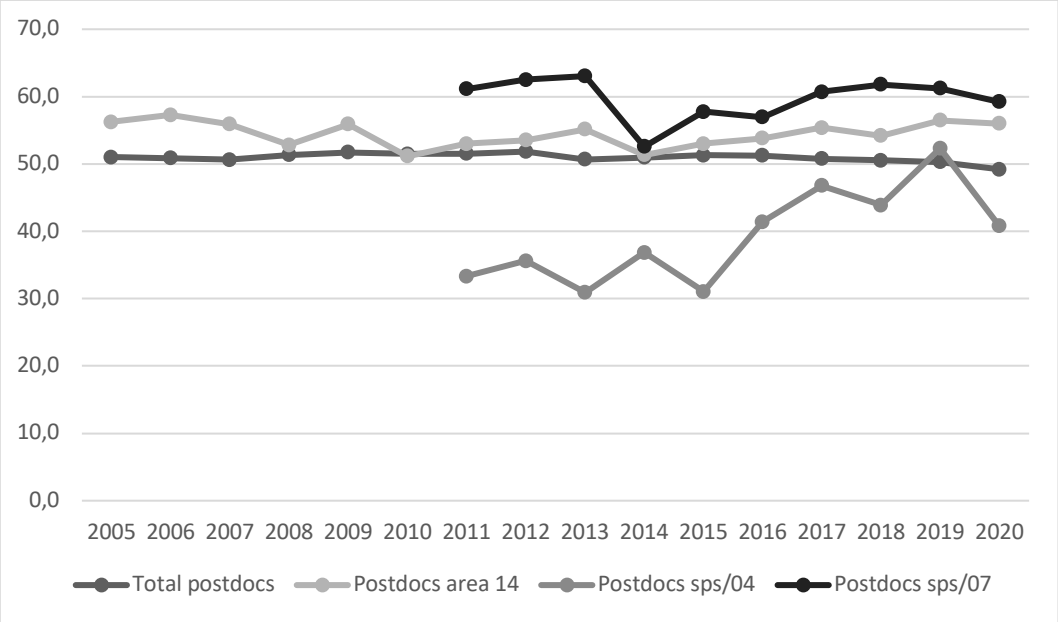
To address our research questions, we first provide descriptive statistics on gender distribution across positions and years, in the whole academic population and in the field and sub-fields under investigation. Secondly, we provide the three above-mentioned indexes in the same sub-populations.

Figures from 1 to 6 show women's distribution across the hierarchy, taking into account the whole academic population comprising all scientific fields, the field of Political and Social Sciences (Area 14), and the sub-fields of Political Science (SPS/04) and General Sociology (SPS/07).

Figure 1 shows that post-doctoral positions are rather gender-balanced, with women representing 51 percent on average from 2005 to 2020 considering all fields. However, after the Gelmini reform and the end of the turnover freeze, the data witness a slight decrease in the female post-docs rate. Moreover, the female presence is higher in Area 14 than in all fields combined. The average over the whole period is 54.4 percent of female postdocs, with a decrease during the turnover freeze (53.2%) and an increase afterwards (55.6%).

Turning to the sub-fields SPS/04 and SPS/07, data on postdocs are only available from 2011 onwards. The early career situation is different when Political Science (SPS/04) is compared to the broader Area 14 and to General Sociology (SPS/07). In fact, over the period considered (2011-2020), the share of female postdocs in SPS/04 (mean value 39.3%) is always lower, both compared to the entire population (except for the year 2019) and compared to Area 14 (-15.1 percentage points) and especially to SPS/07 (-20.4 percentage points). In sum, Figure 1 shows that while feminization is stronger in Area 14 and especially in SPS/07, SPS/04 stands out for its persistently low representation of women. This result is in line with our expectations and confirms that SPS/04 is still a male-dominated sector even at the bottom of the academic ladder.

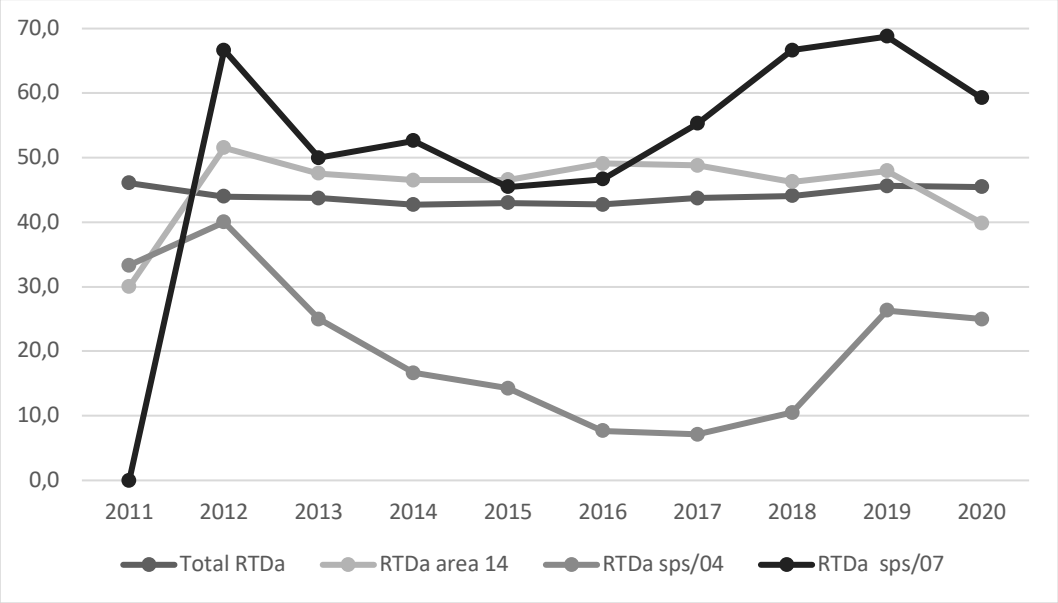
Figure 1. Percentage of Female Post Doc: total population, Area 14, SPS/04 and SPS/07 (2005-2020)



Note: First post-docs per sub-field (in SPS/04 and SPS/07) appeared in 2011.
Source: authors' elaboration.

As, junior assistant professor (RTDA) is a precarious position which was introduced by the Gelmini reform. However, it is perceived as a more stable position compared to the post-doc, as it is the stepping stone to tenure-track positions. In contrast to the post-doc position, Figure 2 shows that such a position is not gender equal, both considering all fields combined (mean value for women equal to 44.1% in the timeframe) and Area 14 only (mean value 45.4%). Similarly to post-doctoral positions, the sub-fields of Political Science and General Sociology behave very differently. Women represent on average 51.1% of the RTDAs in General Sociology over the period considered. However, until 2017, women were less than half of the population (45.2%), while after the turnover freeze, a significant increase was observed, with a peak of 69% of female RTDA in 2019. On the contrary, female RTDAs in Political Science are equal to 20.6% throughout the period, with a peak of 40 percent in 2012. However, this peak may reflect the small overall number of contracts in that year, which inflate the percentage. This result again confirms the unequal representation of women in Political Science.

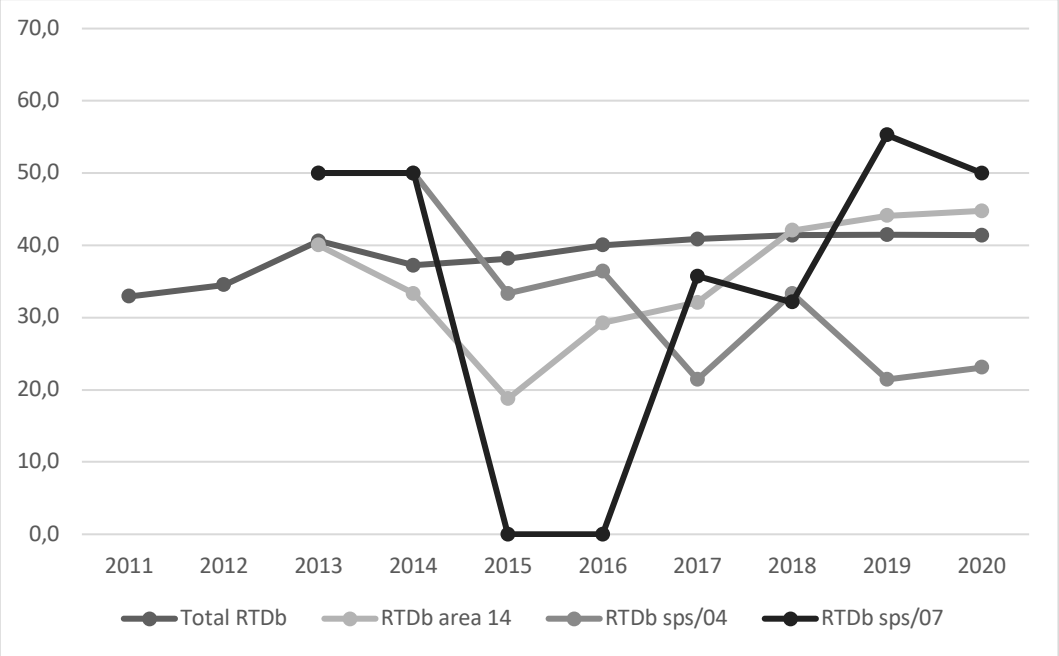
Figure 2. Percentage of Female RTDA: total population, Area 14, SPS/04 and SPS/07 (2011-2020)



Note: in 2011, there was only one RTDA SPS/07 hired, a man, which explains the 0% value in the graph.
Source: authors' elaboration.

Figure 3 shows that, considering all fields combined, from 2011 to 2020 the presence of female RTDBs – which, as aforementioned, is a tenure-track position – is less than 40%, being on average 38.8%. The female rate of RTDBs in Area 14 is even lower (35.5% being the mean value over the whole period), although after 2018 (and thus by the end of the freeze of the turnover) it experiences an increase, reaching or slightly exceeding the percentage of RTDBs in the whole academic population. As far as the SPS/04 and SPS/07 sub-fields are concerned, useful comparisons can only be made from 2013 onwards. Also due to the low number of contracts, in both 2013 and 2014 women represent half of the population in both sub-fields. In 2015 there is a strong decrease for both sub-fields and from that moment on, the female rate of RTDBs in Political Science has always been smaller than the one considering all fields combined. As for Sociology, the rate of female RTDBs was unstable up until 2018, with a substantial parity in the first years followed by a drop in 2015 and 2016 when no women were reported (but this should be interpreted in the light of the low number of RTDBs across sub-fields more in general). In the last two years considered, the rate of female sociologists exceed the percentage of female RTDBs in the whole academic population, in Area 14 and in the SPS/04 sub-field. Today, they represent half of the population in their sub-field, while in the SPS/04 sub-field the share of women has decreased and is barely less than a quarter of the total population of political scientists. This may be related also to the fact that the RTDA position, from which some RTDBs are recruited, is more male-dominated in Political Science than in General Sociology.

Figure 3. Percentage of female RTDB: total population, Area 14, SPS/04 and SPS/07 (2011-2020)

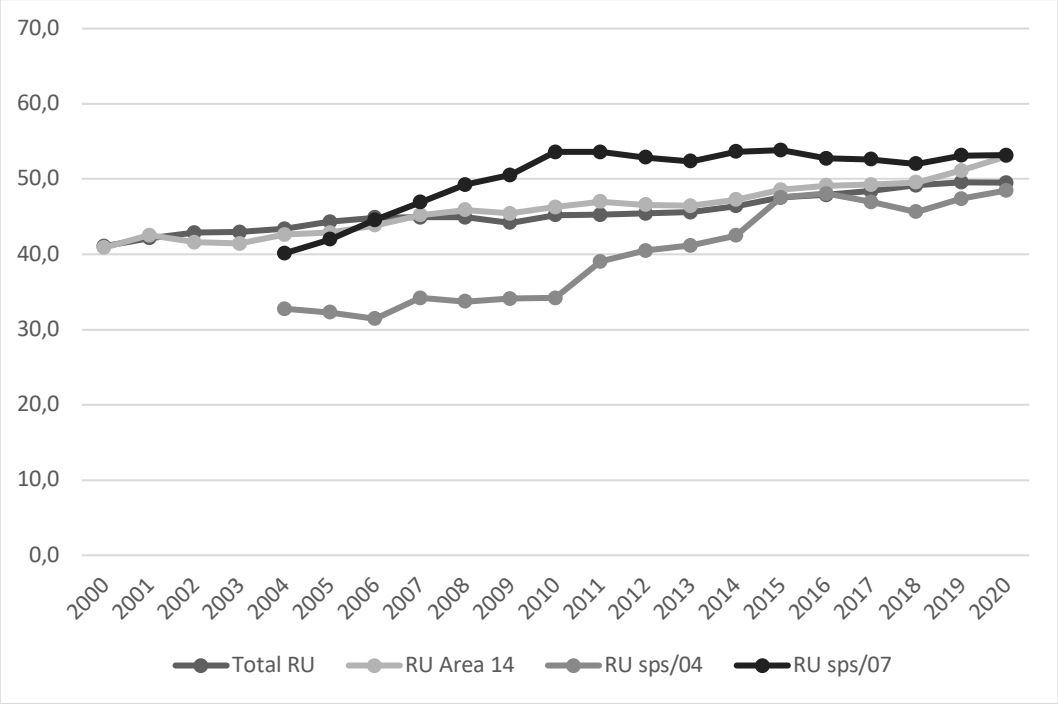


Note: In 2011, Area 14 accounted for only two RTDBs, both in the SPS/07 sub-field and both women. The following year two men were hired (in the SPS/07 and in the SPS/08 sub-fields). Because of the low numbers of RTDBs registered in these two years, which makes gender distribution irrelevant, the year 2011 and 2012 were removed from the graph both for Area 14 and for the two sub-fields to make data easier to interpret. In 2015 and 2016, there were no female RTDBs for the SPS/07 sub-field, but only one and nine male RTDBs, respectively. The data suffer from low numbers, leading to strong fluctuations from year to year.
Source: authors' elaboration.

Although the tenured pre-reform RU position was legally abolished in 2010, a transitional period allowed universities to continue, albeit at a decreasing rate, to recruit for this role for some time thereafter. In fact, around 1,000 RU were recruited both in 2010 and in 2011, then the recruitment of this type of contract dropped to 500 in 2012, 50 in 2013 and it kept on dropping in the following years in the whole population. Interestingly, Figure 4 shows that the feminization of this position has increased since 2010 for all the categories examined also because of the higher likelihood for men of becoming associate professors compared to women, who have gradually become the majority of pre-reform assistant professors (Gaiaschi and Musumeci 2020).

Both the precarization of early academic positions and the freeze on staff turnover have contributed to the feminization of the pre-reform tenured assistant professorship (RU). In particular after the Gelmini reform female RU increased across all fields (+3.8 percentage points from 2011 to 2020), for Area 14 (+5.3 percentage points), for SPS/04 (+11.5 percentage points) and for SPS/07 (+6.3 percentage points). In other words, women have become, or are close to becoming, the majority of academic staff in a stable but less prestigious position. Our data show that this is precisely the case in the SPS04 sub-field as well. Probably, as some qualitative research has pointed out (Bosco & Feo 2024), it is likely that the very high or exclusive presence of men in ASN and selection committees tends to favour homosocial choice mechanisms, particularly in highly masculinized fields such as SPS/04.

Figure 4. Percentage of Female RU: total population, Area 14, SPS/04 and SPS/07 (2000-2020)

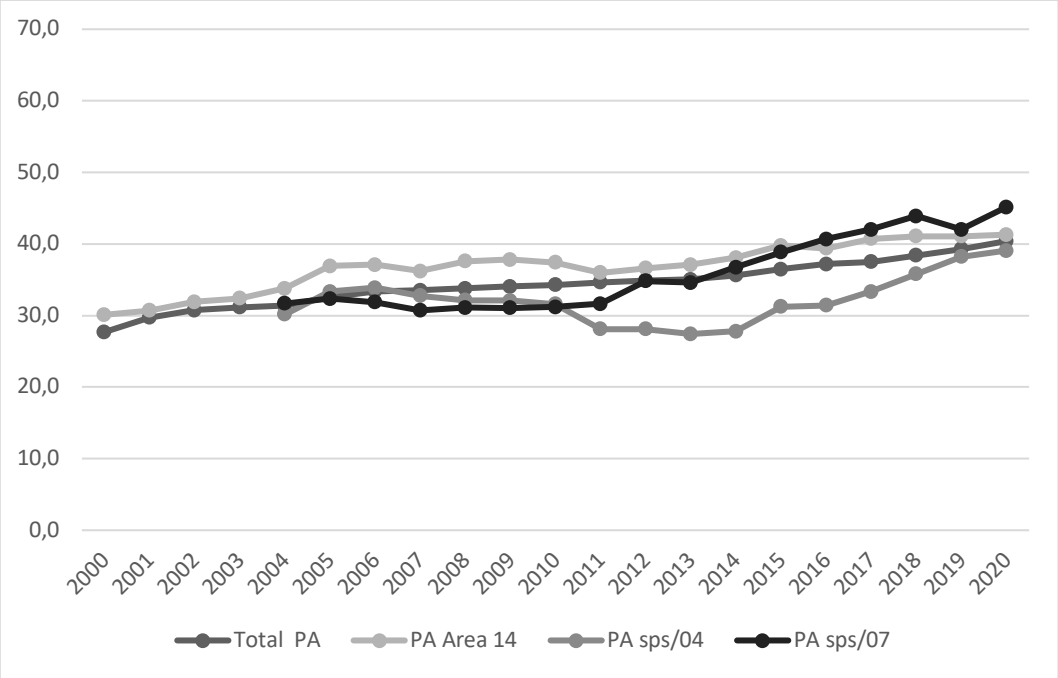


Source: authors' elaboration.

With regard to the associate professor position (PA), the average proportion of women in all fields from 2000 to 2020 is equal to 34.4%. As shown in Figure 5, the proportion of women in Area 14 is always higher compared to the entire population, with an average of 36.8% over the whole period. Within Area 14, the sub-field of General Sociology (SPS/07) out-performs the Area while the sub-field of Political Science (SPS/04) under-performs it, with the lowest female proportion at this level. Regarding trends, the data suggest a slight amelioration in the number of women among associate professors which is quite constant over the years in the general population and in Area 14, while the two sub-fields show non-linear trends, probably due to the lower numbers, with an acceleration of recruitments between 2004 and 2010 for SPS/07 and between 2010 and 2015 for SPS/04. However, unlike the other categories, the share of female political scientists remained below 40% even after the turnover freeze ended.

Despite the feminization of pre-reform tenured assistant professor and associate professor positions, we can still confirm our expectation of a lower presence of female political scientists compared to women in all fields and the SPS/07 sub-field.

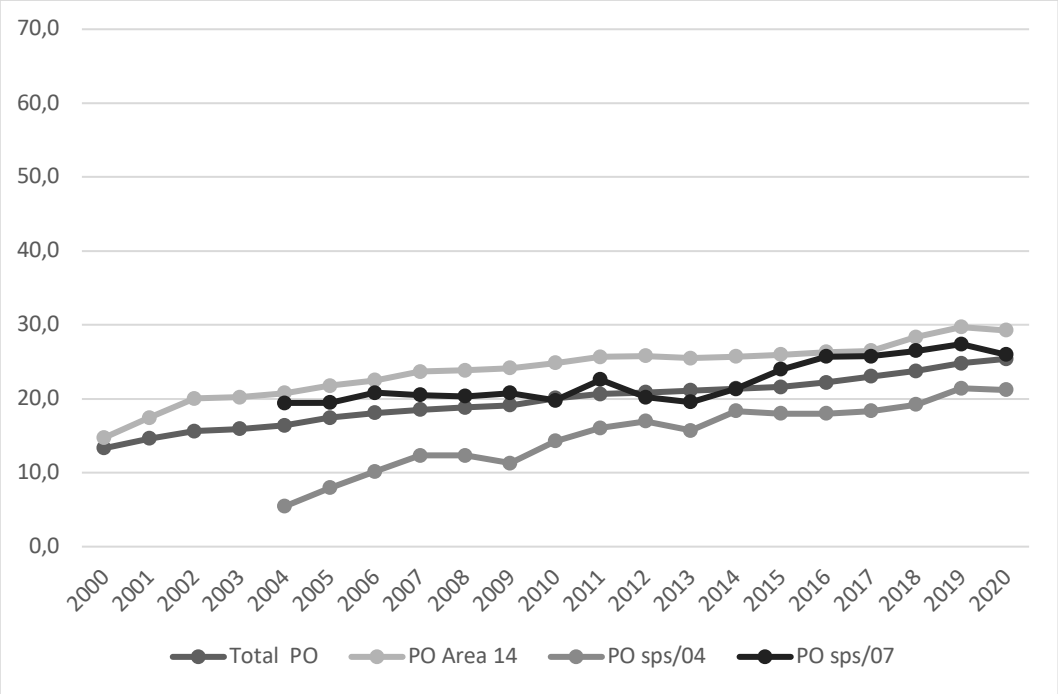
Figure 5. Percentage of female associate professors: total population, Area 14, SPS/04 and SPS/07 (2000-2020)



Source: authors' elaboration.

As expected, the gender gap is by far the widest for female full professors (PO). As shown in Figure 6, the threshold of 20% of women was reached in Area 14 in 2002, in General Sociology in 2006 and in 2010 for all the fields together, whereas in Political Science this threshold was not exceeded until 2019. Once again, SPS/04 seems to be the most problematic sub-field from a gender perspective. In fact, the share of female full professors in the sub-field of Political Science is always lower than the share of female full professors over the whole academic population, Area 14 and SPS/07. With regard to trends, the data suggest a slight amelioration in the number of women over time, which is constant for the general population, Area 14 and the SPS/07 sub-field, with a pretty flat trend from 2005 to 2013, which – at least for the most recent years – may be partly due to the cuts in turnover. The effect of the restrictions in funding is more apparent for the SPS/04 sub-field, which witnessed a strong deterioration in the female rate from 2009 to 2014. The highest presence of women full professors was after the end of the turnover freeze for all categories, specifically in 2019 for Area 14 (29.7%), SPS/04 (21.4%) and for SPS/07 (27.4%), whereas for all fields combined the peak was registered in 2020 (25.4%).

Figure 6. Percentage of Female Full Professors: total population, Area 14, SPS/04 and SPS/07 (2000-2020)



Source: authors' elaboration.

6. Measuring vertical segregation with glass indexes

In order to better measure the disadvantages that women experience throughout all the steps of the career ladder, starting from the highest level, i.e. full professor, then looking at the middle position of associate professor, and finally focusing on the lowest position, i.e. RTDB (or RTDB plus RTDA), we use the following indexes: the Glass Ceiling Index (GCI), the Glass Bottleneck Index (GBI) and the Glass Door Index (GDI).

Regarding the GCI, Table 1 shows a progressive amelioration in the index over time across all fields and for Area14. With regard to sub-fields, one must remember that these indexes reflect the lower number of observations, which make them quite unstable from one year to another. Having said that, the SPS/04 index has been quite stable over time, while the SPS/07 index has experienced a non-linear trend, with a slight deterioration from 2008 to 2013, after which it started to decrease again, suggesting that the turnover freeze was particularly strong for sociologists and for female sociologists more specifically. The end of the freeze seems to have improved the situation for all categories, as from 2017 the index decreases for the academic population (from 1.87 in the years 2007-2017 to 1.65 in the years 2018-2020 on average), for Area 14 (from 2.00 to 1.79), for the SPS/07 sub-field (from 2.03 to 1.93) and, though to a smaller extent, for the SPS/04 sub-field (from 1.45 to 1.42). The data show that, despite the strong feminization of Area 14 (stronger than the whole academic population, see Fig. 6), it is still more difficult for women to become full professors in this field compared to all other fields. Similarly, despite the higher presence of women in SPS/07 compared to SPS/04, the data show that

female sociologists are less likely to become full professors than female political scientists.

All in all, our third expectation was only partially confirmed. By the end of the turnover freeze, the number of female full professors in SPS/04 had increased only marginally. In other words, the legacy of strong masculinity in the sub-field has not been challenged.

Table 1. Glass Ceiling Index: Total population, Area14, SPS/04 and SPS/07 (2005-2020)

Year	GCI	GCI - area 14	GCI - SPS/04	GCI - SPS/07
2005	1.99	2.13	1.40	1.87
2006	1.96	2.12	1.37	1.88
2007	1.94	2.11	1.44	1.87
2008	1.94	2.11	1.41	1.93
2009	1.95	2.12	1.38	1.95
2010	1.89	2.01	1.37	1.96
2011	1.86	1.98	1.45	2.13
2012	1.88	1.99	1.52	2.14
2013	1.87	1.99	1.44	2.11
2014	1.86	1.95	1.48	2.05
2015	1.84	1.96	1.46	2.08
2016	1.80	1.91	1.52	2.01
2017	1.74	1.87	1.48	2.05
2018	1.70	1.83	1.43	2.01
2019	1.64	1.79	1.49	1.96
2020	1.60	1.74	1.35	1.90

Source: authors' elaboration.

With regard to the GBI, Table 2 shows a clear disadvantage for women in becoming associate professors, although this gap is less pronounced compared to that of full professors. In particular, regarding the whole period (2005-2020), this index is higher on average for women in the SPS/07 sub-field (1.31), compared to Area 14 (1.28) and to all fields combined (1.22), while for women in the SPS/04 sub-field it is rather low as it reaches full parity (with a mean value over the years equal to 0.98, suggesting a slight female advantage). At the same time, the end of the turnover freeze seems to have improved the situation for women, considering all fields combined (from 1.24 in the years 2007-2017 to 1.13 in the years 2018-2020 on average) and in Area 14 (from 1.29 to 1.20 comparing the two sub-periods), but the improvement was slight for female sociologists (from 1.33 to 1.32) and does not affect the situation of political scientists (equal to 0.98 on average in both periods).

All in all, results show that despite the higher presence of associate professors in SPS/07 compared to SPS/04, it is in the former that it is more difficult for women to reach the position of associate professor. The good performance of female political scientists at the associate level parallels the fairly good results reported at the full professor level.

Consequently, our third expectation is not met for associate professors in SPS/04. Specifically, the share of women remains unchanged over time and does not appear to be impacted by the end of the turnover freeze.

Table 2. Glass Bottleneck Index: total population, Area 14, SPS/04 and SPS/07 (2005-2020)

Year	GBI	GBI - area 14	GBI - SPS/04	GBI - SPS/07
2005	1.27	1.32	1.01	1.15
2006	1.26	1.33	0.98	1.17
2007	1.26	1.33	1.00	1.19
2008	1.26	1.33	0.98	1.24
2009	1.27	1.34	0,98	1.25
2010	1.26	1.30	0.96	1.31
2011	1.25	1.30	0.98	1.41
2012	1.26	1.30	1.01	1.44
2013	1.26	1.31	0.97	1.43
2014	1.24	1.27	0.98	1.35
2015	1.21	1.26	0.95	1.34
2016	1.19	1.23	1.00	1.30
2017	1.18	1.24	1.00	1.35
2018	1.16	1.21	0.98	1.34
2019	1.14	1.21	1.03	1.33
2020	1.11	1.17	0.94	1.29

Source: authors' elaboration.

Tables 3a and 3b report indexes at the assistant professor level . In order to calculate the index, the female rate among pre-reform assistant professors (RU) is used up until the year 2012. Since 2013, the female rate among the post-reform assistant professor has been used instead[7]. Table 3a shows the index calculated by considering the senior assistant professor only or 'RTDB', which is a tenure-track position (see section 4), whereas Table 3b considers both senior (RTDB) and junior, non-tenure-track (RTDA), positions.

Starting with the stricter version (Table 3a), the data show that, on average, it became more difficult for women to obtain an assistant professor position after the Gelmini reform, i.e. after the change from a stable to a temporary contract for assistant professors. This holds true, both for all fields (from 1.04 in the period 2005-2010 to 1.18 in the period 2011-2020 on average) and for Area 14 (from 1.09 to 1.46 on average). Unfortunately, the lack of data on post-docs in SPS/04 and SPS/07 does not allow us to look at changes across the two sub-periods for these two sub-fields.

At the same time, the comparison with the GBI in the post-reform era proves to be particularly eloquent: since 2013, it has become more difficult for women both in Area 14 and in General Sociology to obtain a senior assistant professor position compared to associate professor position (1.56 vs. 1.24 on average for Area 14 and 1.42 vs. 1.34 for

[7] We chose 2013 as the starting year to calculate the GDI with the post-reform assistant professor because in 2011 and 2012 recruitment of this figure was negligible.

SPS/07 over the period 2013-2020). As for all fields combined, the penalty, since 2013, is extremely similar (1.19 vs 1.21). However, it should be observed that in the pre-reform years it was much easier, for women, to become assistant professor than associate professor. Once again, the political scientists behave quite differently, as there is a negligible difference in achieving the associate professor position compared to the RTDB position in the post-reform years (0.98 vs. 0.96). These results suggest that, generally speaking, the strongest obstacles for women are now not so much in the transition from assistant to associate professor, as it was before the reform, but in the previous step, from post-doc to assistant professorship. This is quite trivial given that, following the Gelmini reform, the senior assistant professor is – de facto – a 'quasi' associate professor, as such a contract is quasi-automatically transformed into an associate professor position after three years. As a consequence, women's negative selection has now been brought forward to the previous level. However, this does not hold true for political scientists, where the GBI and the GDI remain quite similar, with few women making the pool of candidates (both in the case of promotion to associate professor and in the case of promotion to assistant professor) and more or less the same (few) women get promoted.

Since 2018, that is after the end of the freeze, the data suggest that the situation has improved as the GDI has decreased for all categories, although the disadvantage for women in the SPS/07 sub-field is always the highest (1.55 on average for the period 2018-2020) compared to the SPS/04 sub-field (0.95) and the whole of Area 14 (1.23).

Table 3a. Glass Door Index (RU and RTDB): total population, Area 14, SPS/04 and SPS/07 (2005-2020)

Year	GDI (b)	GDI (b) - area 14	GDI (b) - SPS/04	GDI (b) - SPS/07
2005	1.05	1.09	na	na
2006	1.04	1.10	na	na
2007	1.04	1.08	na	na
2008	1.04	1.05	na	na
2009	1.05	1.08	na	na
2010	1.05	1.03	na	na
2011	1.05	1.04	0.95	1.04
2012	1.05	1.05	0.95	1.06
2013	1.23	1.35	0.62	1.22
2014	1.33	1.50	0.68	1.05
2015	1.30	2.69	0.84	na
2016	1.22	1.70	0.99	na
2017	1.18	1.57	1.71	1.59
2018	1.15	1.19	1.05	1.78
2019	1.15	1.25	0.97	1.48
2020	1.14	1.23	0.83	1.39

Source: authors' elaboration.
Notes: 1) n.a. (not applicable): either post-docs did not have an SDS at the time (years 2005-2010) or all positions were covered by men (2015-2016). 2) From 2005 to 2012 pre-reform assistant professors (RU) are considered; from 2013 onwards RTDs B only.

Regarding the same index including the junior positions (Table 3b), data confirm that, even considering the RTDA, the Gelmini reform has made it harder for women to become assistant professors. Indeed, the average GDI increased from 1.05 in the years 2005-2012, to 1.14 in the years 2013-2020 for all fields. Similarly, the GDI increased from 1.06 to 1.16 for Area 14 comparing the same two sub-periods. The data show that the years from 2013 to 2017 were particularly challenging for women, and with the end of the turnover freeze, the GDI started to decrease for all categories, suggesting than when resources are scarce, women pay the highest price.

Moreover, the results also shows that in most cases it is less difficult, for women, to obtain an assistant professor position when the junior (RTDA) position is included in the analyses. This is particularly the case for all fields taken together, for Area 14 and for General Sociology, but not for Political Science for which the female disadvantage in becoming RTDA+RTDB is higher than the female disadvantage in becoming RTDB only (1.66 for the former vs 0.96 for the latter in the years 2013-2020).

This result parallels a further consideration: if, contrary to the rest of the academic population (including the field of Political and Social Sciences and the sub-field of General Sociology), in the sub-field of Political Science the transition to RTDB (GDIb), as already said, shows the same female disadvantage as the transition to associate professor (GBI), this is not the case when for the junior assistant professor position, as the GDI(a+b) index worsens to 1.66 in the years 2013-2020, against 0.98 for the GBI in the same years.

Table 3b. Glass Door Index (RU, RTDB and RTDA): total population, Area 14, SPS/04 and SPS/07 (2005-2020)

Year	GDI (a+b)	GDI (a+b) - area 14	GDI (a+b) - SPS/04	Year
2005	1.05	1.09	na	na
2006	1.04	1.10	na	na
2007	1.04	1.08	na	na
2008	1.04	1.05	na	na
2009	1.05	1,08	na	na
2010	1.05	1.03	na	na
2011	1.05	1.04	0.95	1.04
2012	1.05	1.05	0.95	1.06
2013	1.15	1.15	1.03	1.22
2014	1.18	1.11	1.58	1.00
2015	1.17	1.18	1.59	1.25
2016	1.17	1.19	1.74	1.39
2017	1.13	1.19	2.57	1.13
2018	1.12	1.13	1.62	1.13
2019	1.10	1.14	1.72	1.00
2020	1.08	1.19	1.42	1.07

Source: authors' elaboration.

Notes: 1) n.a. (not applicable): either post-docs did not have an SDS at the time (years 2005-2010) or all positions were covered by men (2015-2016). 2) From 2005 to 2012 pre-reform assistant professors (RU) are considered; from 2013 onwards RTDs A and B only.

In other words, if, after the reform, the female obstacle for all, including sociologists, is represented by the senior assistant professor position, in the sub-field of Political Science the real milestone is placed at the junior assistant professor position. As mentioned, this position often comes before that of senior assistant professor. As such, it basically represents the access point of an academic career.

Consequently, our second expectation is not fully confirmed, since the reforms have had a worse impact on women's career entry at the RTDA level than at the RTDB level. This result appears to be a peculiarity of SPS/04.

7. Conclusions

Women have massively entered the academic profession but their presence is not the same across fields and positions. Regarding the Italian academic population with a specific focus on the Political Science sub-field, our research shows three important findings.

First, the most precarious positions are the most gender balanced. In fact, postdoctoral positions show an equal distribution between men and women, considering all fields together, the field of the Political and Social Sciences (Area 14), as well as the SPS/04 (Political Science) and SPS/07 (General Sociology) sub-fields.

Second, the less prestigious the positions, the more likely they are to be feminized: as the position of pre-reform assistant professor (RU) was abolished by the 2010 University reform, data show that in the long run such positions are filled more by women than by men. As a result, while male pre-reform assistant professors are more likely to become associate professors, female pre-reform assistant professors are more likely to remain in this stable but less prestigious position and often their careers end in such a role.

Third, there has been an increase in the number of women in the middle (associate professorship) and top (full professorship) positions, but for both positions and especially for the position of full professor, the gender balance is still an objective to reach. Moreover, the amelioration in women's representation in these positions has been quite significant since the end of the turnover freeze, that is from 2017 onwards, suggesting that when financial resources are scarce, women pay a higher price. On the contrary, when opportunities – of promotion in this case – increase for all, women's opportunities increase as well.

As far as the possibility of climbing the academic ladder is concerned, the data show that, as expected, full professorship represents the hardest step to reach for women in Italy. Moreover, it is in highly feminized fields that it is more, not less, difficult for women to become full professors. This is true both for Area 14 compared to all other fields combined, and for General Sociology compared to Political Science. This finding suggests that numbers, and thus a good rate of feminization in the population, is a necessary but not sufficient condition for gender equality to occur in the top position. Paradoxically, when women are few, female promotions to middle and top positions are easier. Such results provide a contribution to the wider debate on the relation between horizontal and vertical segregation: do feminized sectors, occupations and fields ameliorate the gender promotion gap? On this point, the literature is not consistent, with some studies pointing to an amelioration in female opportunities when a 'critical mass' (Kanter 1977) is reached (Reskin and McBrier 2000; Rubery and Rafferty 2013), and others,

on the contrary, showing that career progression is easier in male-dominated occupations (England, 1982; Hultin, 2003; Gaiaschi 2022). Faced with this debate, our contribution provides an argument in support of the second position, pointing to the 'positive' effects, in terms of career progression, of the stronger selection and self-selection of women in male-dominated fields: few of them enter but, once in, many of them survive the subsequent steps.

Furthermore, data show that the real obstacle for women is no longer at the level of the position of associate professor, as in the pre-reform years, but it now coincides with that of RTDB, and so with the senior assistant professor position, at least for all fields considered, for the field of Political and Social Sciences and for the sub-field of General Sociology. From this point of view, results suggest that after the Gelmini reform it became more difficult for women to become tenure-track assistant professors than associate professors, and the end of the turnover freeze has not yet reversed this situation. However, this does not hold true for the sub-field of Political Science, for which the barred door coincides more with the junior (RTDA) than with the senior (RTDB) assistant professor position. Once again, this sheds light on the fact that the problem, for Political Science, is at entry level rather than at the subsequent steps of the ladder. Gender discrimination occurs when it's time to obtain what, in Italian academia, is considered the first 'real' (quasi-stable) position: that of junior assistant professor. In other words, and citing the aforementioned metaphors on women and science, the gender question at the heart of the Political Science sub-field is 'why so few?' rather than 'why so slow?'

All in all, our paper highlights the specificity of the sub-field of Political Science when a gender perspective is taken into account. On the one hand, as expected, in SPS/04 there are fewer women in all academic positions, including among the most precarious ones, namely postdocs. In other words, political science is still a male-dominated field, regardless of the position considered. On the other hand, the recruitment process in the SPS/04 sub-field is particularly unfavourable for women when it comes to the possibility of entering the profession as a junior assistant professor. However, once in, their chances of progressing to more prestigious positions are equal to, or even better than their female colleagues in the rest of the academic population, including Area 14 and the SPS/07 sub-field. From this point of view, the sub-field of Political Science shares many more similarities with the hard sciences than with the social and human sciences: the problematic step, for both, lies more in accessing the profession than in promotions, probably due to the higher selection and self-selection of women who survive the entry point (Gaiaschi 2022; Gaiaschi forthcoming). Further research on this point is needed.

Taking all our results together, we can generally conclude that the Gelmini reform and the freeze on staff turnover worsened the conditions of women in academia. As long as neoliberal funding cuts to universities persist, no meaningful progress in gender equality can be achieved within the Italian system.

What are the possible solutions in order to achieve gender parity, both at entry level (in the case of still under-feminized sub-fields like Political Science) and in promotion to stable and prestigious positions more in general?

According to our macro-level perspective, any solution to the gender gap in Italian academia should start with the idea of putting more money on the table. However, more

money is needed not only to create new positions to facilitate women's access to the profession, but it should also be used to create more *stable* positions.

However, recent policies seem to be going in a different direction. In fact, funding provided by the EU through the PNRR has mostly led to the creation of RTDA positions, i.e. non-tenure track positions that are unlikely to lead to further progression. Once again, therefore, the investment has proved to be short-sighted and risks creating, in the longer term, a bubble of non-tenured assistant professors who will then be forced to leave the academic labour market. Unfortunately, research shows that this will have a much greater impact on women than on men.

Furthermore, the recent cuts in FFO, foreseen by the latest decree of the Meloni government, will end up freezing most career progressions and stopping recruitment. As we have seen, the cuts are likely to affect women more than men. Finally, the 'Bernini' bill (DDL 1240), formulated in autumn 2024, exacerbates the vulnerability of public universities and early-career researchers. Indeed, the reform increases the number of precarious contractual roles, which are now expected to total five: post-doctoral contracts, two types of research assistance grants, and adjunct professorships. In conclusion, we do not see any improvement for women in Italian academia in the near future.

Author contributions

The article is the result of a joint contribution by the authors, whose names appear in alphabetical order. However, if for academic reasons individual responsibility were to be attributed, please refer to the following CRediT authorship contribution statement. Camilla Gaiaschi: conceptualization (equal), funding acquisition (lead), investigation (lead), methodology (lead), data curation (lead), formal analysis (lead), writing - original draft (supporting), writing - review & editing (equal). Selena Grimaldi: conceptualization (equal), formal analysis (supporting), writing - original draft (lead), writing - review & editing (equal).

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