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# The Gendered Shaping of Academic Career in Italy. A Case Study

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***Short abstract***

Over recent years, a new emphasis of European policies has been addressed to the need to promote equal opportunities and equal participation to women and men in research's career, and guarantee gender balance in decisional roles in research activities. In Italy, the research and academic working environment does not seem free from gender differentials. The ultimate aim of this study is to investigate gender differences in career trajectories. As a case study we focus on the University of Florence. Data come from a specific survey on family and academic careers carried out on both permanent and temporary academic staff of the University of Florence.

All in all, we found that the careers trajectories at the University of Florence are gendered shaping. In particular, whereas we proved an equal gender distribution in the first stages of academic career – i.e., as for Research Assistant positions – we found a gender gap in the progression toward higher roles – i.e., Associate and Full Professor positions. These differences are particularly relevant in some scientific and research fields, for instance the technology and the scientific one, and to a lesser extent also in the social sciences one, within which women have lower probabilities of carrier progression. We did not find evidence that this gender gap is attributable to individuals' choices about their family life, for instance linked to childhood or union formation. At this stage, it seems that, although gender balances are not dramatic, several advancements are needed in Italy in order to transform academia towards a more gender equal environment.

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***Extended abstract***

## 1 Background

Equality between women and men is one of the European Union's founding values, a strategic objective and a driver for economic growth: The promotion of an effective gender equality – i.e., equal economic independence for women and men, equal labor market opportunities and equal pay for work of equal value, equal access to decision-making positions, dignity, integrity and ending gender-based violence in the different spheres of life – is essential to build stronger economies and improve the quality of life for women, men, families and communities (European Commission, 2011). The European Union has made significant progresses towards gender equality over the last decades, thanks to integration of the gender perspective into all other policies (gender mainstreaming) and the adoption of specific measures. Promoting non-discriminatory gender roles in all areas of life thus has represented strategic goals of recent European policies (European Commission, 2011, 2015a). In this framework, a new recent emphasis has been addressed to the need to guarantee and promote equal opportunities and equal participation to women and men in research's career, and gender balance in decisional roles in research activities (European Commission, 201a5). Nevertheless, gender differences are difficult to eradicate, and various European countries seem to be only at the onset of this process.

Changes toward gender equality in the different domains of life (e.g., education, work, family, and institutions) pass through increasing levels of education, indeed. In this context, recent data are showing a renovated trend, above all among the youngest cohorts.

Virtually all European countries are registering a strong increase in both enrolment and graduating rate of women, and data show that women are also graduating more successfully than men (e.g., Schofer and Meyer, 2005; Lutz, Cuaresma, and Sanderson, 2008; Vincent-Lancrin, 2008). For instance, over recent years the rate of European ISCED-6 graduates has grown by 4.4 percentage points annually for women, whereas men graduates have grown by 2.3 percentage points (European Commission, 2015b). Thanks to these trends, in 2012 women represented the 47% of all European graduates (ibid). This implies that in many countries, for the first time in history, there are more highly educated women than highly educated men that are entering in early adulthood.

Despite these positive signals in educational tendencies, a gender gap remains in the European labor markets (European Commission, 2011, 2015a). Female participation in the labor market is still low compared to that of men, and it is remarkably low in certain countries. At the beginning of the current decade, female employment rate rose to 62.5% (an increase of 5 percentage points with respect to 10 years before); indeed, it seems that Europe is still very far from reaching the target of 75% of women in employment in 2020 (European Commission, 2015a). Profound improvements are also needed as for the difference between men's and women's earnings: in the European Union the gender pay gap remains at 17.8%, ranging from the 25-30% of some Eastern countries, to less than 10% of Italy, Belgium and Romania. The pay gap also reflects other inequalities on the labor market mainly affecting women – in particular their disproportionate share in family responsibilities and the difficulties in reconciling work with private life (European Commission, 2011).

Italy displays peculiar characteristics in all these respects relative to other European countries. The positive trends in education are characterizing also the Italian context. For instance, women made up 53% of graduates in 2012, with an annually growth rate of 10% (European commission 2015b). Nevertheless, it appears that Italian women graduates have higher difficulty relative to men to find (or maintain) a job, except for in some traditionally feminine areas, like chemical-pharmaceutical, humanities and teaching, where being a woman seems to be advantageous. For example, over 50% of the employed women works as secretary or keyboard-operating office clerks, customer services, clerks shop, market sales workers, or (pre-)primary education teaching (Pirani and Salvini, 2015; European Commission, 2011). Italian female labor market participation remains one of the lowest ones in Europe (53% in 2014; Istat, 2015), and even when a woman is employed

this mainly occurs in part-time or other non-standard forms of employment (Pirani and Salvini, 2015). A sort of *horizontal gender segregation* that channels employed women into a restricted range of "female occupations", together with a *vertical division* (Artazcoz et al., 2007) – i.e., minor prestige, limited career opportunities, and lower wages – characterize the Italian labor market. The same level of education and the same skills do not ensure to women an equal access or an equal position in the labor market: almost 50% of men with a high level of education is employed in high level occupations, like senior officials and managers, teaching, business, legal or other kinds of professionals (EU-SILC data), while for high-educated women this percentage goes down to less than 40%. When also considering equal conditions of contracts or job titles, women suffer from lower pay, shorter-term contracts, and less qualified jobs compared to men (Eurofound, 2013).

The research and academic working environments do not seem free from these gender divisions, in Italy as in the rest of Europe. For instance, whereas the quota of highly qualified women appears to be catching up with men, only 33 researchers out of 100 were women in 2012 (European commission 2015b), suggesting an underrepresentation of women within this profession and possible disparities in their career. In Italy this quota amounts to 36% within universities, and 44% within other public research centers (Avveduto and Pisacane, 2015). Between 2005 and 2012, progresses towards gender balance have been made in some fields, such as Medical sciences and Agricultural sciences, but women researchers are particularly underrepresented in Engineering & technology and Natural sciences (ibid.).

The described Italian situation has profound roots in the specific cultural context of the country. Italian work-family system is still partially based on traditional gender roles. Although some things are changing, Italy still represents an example of male-breadwinner society, where men are employed in stable full-time jobs and are the main earners of the household; in contrast, women are charged by most of childbearing and housekeeping activities (Istat, 2015), making very hard for them to balance work and family responsibilities (Anxo et al., 2011). This has been the framework that guided Italian labor market policies for longtime, and this state of affairs have produced across years a strong concentration of men in leading positions in economic, business, political and educational activities and in public institutions.

## 2 Aims of this study

Bearing in mind European concerns, together with the specificities of the Italian context, the ultimate aim of this study is to investigate gender differences in career trajectories. As a case study we focus on the University of Florence, a big university with a long history and placed at levels of scientific excellence in various disciplines (e.g., medicine, economics and social sciences, technology). In particular, we addressed the following research questions:

1) Are there gender differences in the shaping of academic careers of Florence University?
2) In case, are these differences linked to family-life choices (i.e., union formation and childhood)?
3) Is the possible gender gap linked to the scientific academic field?

## 3 Data and Method

Data come from a specific survey on family and academic careers carried out on both permanent and temporary academic staff of the University of Florence. The survey was promoted by the Committee for Equal Opportunities, Employee Wellbeing and Non-Discrimination (CUG) of the University of Florence, and implemented in collaboration with the Department of Statistics, Computer Science, Application (DiSIA), the Department of Political and Social Sciences (DSPS) and the Computer Science Center (SIAF) of the same University.

Data were collected through CAWI technique through a structured questionnaire, aiming at capturing various aspects of individuals' career and family-life choices. First, the questionnaire asked for the career history of individuals – from the first step (i.e., participation to PhD or fellowship programs) to the subsequent academic roles (i.e., Research Assistant, Associate Professor, Full Professor). Respondents were asked to provide information also about possible interruptions in their career, their research field, and the satisfaction level about their current activity. Second, the questionnaire investigated transition to adulthood and family formation (e.g., exit from parental home, union formation, and childcare) and gender roles in the management of domestic life.

Data were analyzed through Event History models, in particular discrete time models. These data offer a unique chance to relate family formation and (university) career histories, in order to investigate vertical and horizontal segregation of women in the

different fields of the academic world. In particular, in order to answer our research questions, we estimated three different sets of models: first, we implemented a model specification for the probability of transition to the position, alternatively, of *i*) Research Assistant, *ii*) Associate Professor and *iii*) Full Professor, controlling for the baseline duration (continuous in years and a quadratic term), the sex and the age of the respondent. Second, we added to these models also covariates referring to childbearing and union formation, testing their interaction with gender. In the third model specification, we introduced the research fields of respondents and an interaction term between it and the sex of the respondent.

## 4 Preliminary Findings

Models results addressing the first research question – i.e., whether there are gender differences in academic careers – are presented in Table 1 in terms of Average Marginal Effects (AMEs). AMEs illustrate the change in the probability to progress in carrier as a categorical covariate changes from one category to another or as a continuous covariate increases of 1 unit, averaged across the values of the other covariates in the model.

*Table 1 – Average Marginal Effects (AMEs, in percentage points) from discrete time logistic regression models predicting probability of transition to i) Research Assistant, ii) Associate Professor and iii) Full Professor positions, University of Florence*

| | ***i) Transition to Research Assistant*** | | | ***ii)Transition to Associate Professor*** | | | ***iii)Transition to Full Professor*** | | |
|---|---|---|---|---|---|---|---|---|---|
| | ***AME*** | ***P>z*** | ***sig.*** | ***AME*** | ***P>z*** | ***sig.*** | ***AME*** | ***P>z*** | ***sig.*** |
| **Sex** | | | | | | | | | |
| *male (ref.)* | | | | | | | | | |
| Female | 0.1 | *0.923* | | -1.1 | *0.002* | ** | -0.9 | *0.000* | *** |
| **Time at risk (in years)** | 1.4 | *0.000* | *** | 1.0 | *0.000* | *** | 0.6 | *0.000* | *** |
| **Time at risk (quadratic term)** | -0.1 | *0.000* | *** | -0.0 | *0.000* | *** | -0.0 | *0.000* | *** |
| **Cohort of birth** | | | | | | | | | |
| *<1950 (ref.)* | | | | | | | | | |
| 1950-59 | 1.6 | *0.055* | * | -0.0 | *0.490* | | -0.9 | *0.011* | ** |
| 1960-69 | 3.8 | *0.000* | *** | -0.0 | *0.766* | | -0.9 | *0.031* | ** |
| >=1970 | 1.8 | *0.039* | ** | -1.3 | *0.024* | ** | --- | --- | |

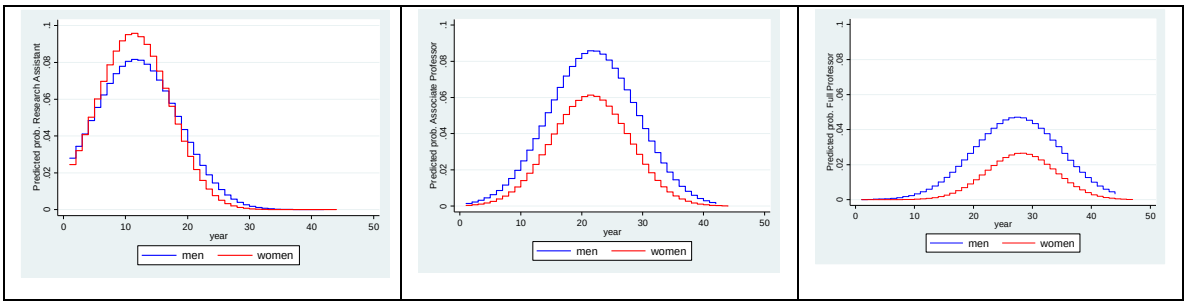
The first clear result is that gender differences operate differently in shaping academic career according to the different stages of the career itself. Indeed, the women's probability of transition to the Research Assistant position for women is slightly higher, although not statistically different, from that of men (5.4% for women vs. 5.3% for men, which implies an AME of 0.1 percentage points, Table 1). In contrast, women show a

lower probability than men to become Assistant Professor (1.9% vs. 3.0%, implying an AME=-1.1) or Full Professor (0.7% vs. 1.6%, AME=-0.9). In synthesis, women are not disadvantaged in the entrance phase in the academic world (i.e., Research Assistant position), but a gender gap is found as for the career progressions toward higher positions (i.e., Associate and Full professor positions).

Table 1 shows also some differences by age. As expected, younger people have a higher probability to become Research Assistants. In contrast, the probability to progress to Full Professor positions is increased as researchers get older (indeed, none of the respondents under the age of 44 had reached this position at the time of the survey).

The baseline risk to progress in career is bell-shaped in all three stages of the academic career (Figure 1): low at the beginning, then it gradually increases, and finally it reduces as time passes. Clearly, the timing and the intensity of the progression change across the three stages. We also tested whether the baseline hazard changes according to gender, but the interaction terms resulted not statistically significant.

*Figure 1 – Baseline hazard risk of the transition to i) Research Assistant, ii) Associate Professor and iii) Full Professor positions, estimated from discrete time logistic regression, University of Florence*




These results lead to the second research question, or whether family life choices, i.e., union formation or childhood, affect the found gender gap. We thus estimated additional models introducing as covariates the time varying variables referring to the union formation and the number of child(ren). Models results (Table 2) did not prove the existence of relevant differences in the probabilities of progression in career depending on the presence of children. A limited association is found according to the union type: both cohabitors and married people display a higher probability, with respect to people not in union, to become Research Assistants (AME equal 2.1 and 1.2 respectively, significant at 10% level), whereas married people have 0.9 percentage points higher probability to pass to the position of Associate Professor. This association is probably due to the typical age

during which the type of union is formed. Finally, we stress that none interaction of these two variables with gender provided statistical significance.

*Table 2 – Average Marginal Effects (AMEs, in percentage points) from discrete time logistic regression models predicting probability of transition to i) Research Assistant, ii) Associate Professor and iii) Full Professor positions, University of Florence*

| | ***i) Transition to Research Assistant*** | | | ***ii) Transition to Associate Professor*** | | | ***iii) Transition to Full Professor*** | | |
|---|---|---|---|---|---|---|---|---|---|
| | ***AME*** | ***P>z*** | ***sig.*** | ***AME*** | ***P>z*** | ***sig.*** | ***AME*** | ***P>z*** | ***sig.*** |
| **Numbers of child(ren)** | | | | | | | | | |
| *no child (ref.)* | | | | | | | | | |
| 1 | 0.0 | *0.990* | | -0.1 | *0.910* | | -0.3 | *0.351* | |
| 2 | -0.2 | *0.799* | | 0.6 | *0.186* | | -0.1 | *0.708* | |
| 3 or more | 2.7 | *0.247* | | 0.3 | *0.702* | | -0.5 | *0.208* | |
| **Type of union** | | | | | | | | | |
| *not in union (ref.)* | | | | | | | | | |
| cohabitation | 2.1 | *0.065* | * | 1.0 | *0.145* | | 0.1 | *0.798* | |
| marriage | 1.2 | *0.073* | * | 0.9 | *0.017* | ** | 0.0 | *0.931* | |

Models controlled for baseline hazard, sex, cohort.

Finally, in order to investigate if and to what extent the gender gap in academic careers differs according to the specific scientific research fields in which individual are involved in, we included in the model specification also the research field classified into: biomedic; scientific; technology; humanities; social sciences. Table 3 reports the AMEs of the research fields on the probability to progress in career in the three investigated positions.

*Table 3 – Average Marginal Effects (AMEs, in percentage points) from discrete time logistic regression models predicting probability of transition to i) Research Assistant, ii) Associate Professor and iii) Full Professor positions, University of Florence*

| | ***i) Transition to Research Assistant*** | | | ***ii) Transition to Associate Professor*** | | | ***iii) Transition to Full Professor*** | | |
|---|---|---|---|---|---|---|---|---|---|
| | ***AME*** | ***P>z*** | ***sig.*** | ***AME*** | ***P>z*** | ***sig.*** | ***AME*** | ***P>z*** | ***sig.*** |
| **Research area** | | | | | | | | | |
| *biomedic (ref.)* | | | | | | | | | |
| scientific | 2.7 | *0.004* | ** | 1.1 | *0.033* | ** | 0.5 | *0.086* | * |
| technology | 3.5 | *0.002* | ** | 1.3 | *0.019* | ** | 0.5 | *0.117* | |
| humanities | 0.7 | *0.524* | | 0.3 | *0.588* | | 0.7 | *0.117* | |
| social sciences | 0.2 | *0.821* | | 1.1 | *0.102* | | 0.8 | *0.088* | * |

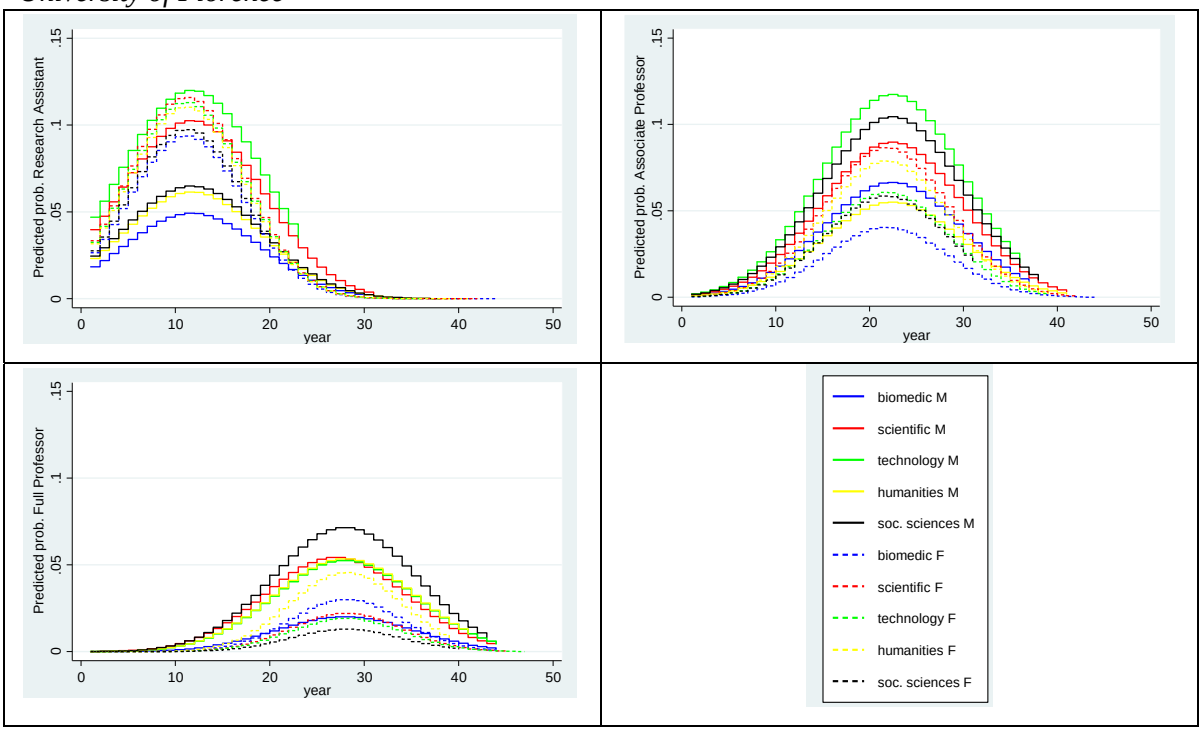
Models controlled for baseline hazard, sex, cohort, presence of children, union status.

First, it is worthwhile noting that, generally speaking, the probability to become Research Assistant is higher for the scientific and technology fields (AME equal to 2.7 and 3.5 respectively) with respect to the biomedic one; humanities and social sciences fields are not significantly different from the biomedic one, instead. The situation is similar as for the transition to Associate Professor (AMEs equal 1.1 and 1.3). As for the

Full Professor position, it seems that the biomedic field is associated with the lowest probability of progression, but in this case differences are less marked (AMEs ranging from 0.5 to 0.8, significant at 10%level).

In order to verify if the overall effect of each research field is differently shaped according to the sex of respondents, we tested the significance of the interaction terms between research field and sex. Figure 2 shows the predicted probabilities to progress in career by gender and research field resulting from this estimation.

*Figure 2 – Predicted probabilities of transition to i) Research Assistant, ii) Associate Professor and iii) Full professor positions, for male (M) and female (F) researchers by research field, University of Florence*




Looking at the first graph of Figure 2, the one referring to the predicted probabilities to become Research Assistant, one can see that entering in the first stage of the academic career is not unfavorable to women, in line with the previous result (see again Table 1). Indeed, women's probability to become Research Assistant is at least equal than that of men, and in some research fields it is even higher (this is the case of biomedic, where the difference of 2 percentage points in advantage of women is significant at 10% level). When considering the progression to the Associate Professor position, things change, however. Almost all curves referring to men are above those referring to women, denoting a higher probability of transition for male researchers. In particular, the women's predicted

probability is particularly low in the technology field (gap of 2 percentage points). These differences are even more marked in the third graph, the one referring to the Full Professor position. In this case, women working in the scientific, technology and social sciences fields have a significant reduced probability to become Full Professor relative to their male colleagues. This gap amounts to 1-2 percentage points on average. Only women in biomedic and humanities fields are not disadvantaged with respect to their male counterpart as for this high stage or the career. Importantly, this disadvantage is even more remarkable when considering that these research fields are associated, on average, to a lower probability of career advancement, other things equal (see again table 3).

## 5 To summarize

All in all, we found that the careers trajectories at the University of Florence are gendered shaping. In particular, whereas women are not penalized in the first stages of their career relative to their male colleagues – i.e., as for Research Assistant positions – we proved a gender gap in the progression toward higher roles – i.e., Associate and Full Professor positions. These differences are particularly relevant in some scientific and research fields, for instance the technology and the scientific one, and to a lesser extent also in the social sciences one. These results might reflect an earlier gender differential in male and female preferences of curricula at high education or university degrees.

Finally, we did not find evidence that this gender gap is attributable to individual choices about their family life, for instance linked to childhood or union formation. At this stage of the analysis, we can only advance a hypothesis for these results. We can imagine that the academic world, where a strong selection based on high levels of education plays a role, is more flexible with respect to other professional environments, and it enables higher levels of family-work conciliation. Or, it may be that partner's characteristics are favorable in this sense. Further work will deepen these findings and their origins.

The present study offered insights from a single case study, the University of Florence, and further investigations should be carried out considering a larger sample (or the entire population) of Italian universities, in order to verify how much Italy is still far from European goals. At this stage, it seems that several progresses are needed to transform Italian academia towards a more gender equal environment.

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