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Quantitative analysis of the Italian National Scientific Qualification



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ABSTRACT

The Italian National Scientific Qualification (ASN) was introduced in 2010 as part of a major reform of the national university system. Under the new regulation, the scientific qualification for a specific role (associate or full professor) and field of study is required to apply for a permanent professor position. The ASN is peculiar since it makes use of bibliometric indicators with associated thresholds as one of the parameters used to assess applicants. The first round of the ASN received 59,149 applications, and the results have been made publicly available for a short period of time, including the values of the quantitative indicators for each applicant. The availability of this wealth of information provides an opportunity to draw a fairly detailed picture of a nation-wide evaluation exercise, and to study the impact of the bibliometric indicators on the qualification results. In this paper, we provide a first account of the Italian National Scientific Qualification from a quantitative point of view. We show that significant differences exist among scientific disciplines, in particular with respect to the fraction of qualified applicants, that cannot be easily explained. Furthermore, we describe some issues related to the definition and use of the bibliometric indicators and the corresponding thresholds. Our analysis aims at drawing attention to potential problems that should be addressed by decision-makers in future rounds of the ASN.

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1. Introduction

The Italian Law 240/2010 (Law dec. 30, n. 240, 2010) introduced substantial changes in the national university system. The law is quite broad in scope: it requires universities to undergo a major internal reorganization, delegates the government to define new rules for improving the quality and efficiency of higher education system, and modifies the recruitment process of university professors. Under the new regulation, to apply for a permanent professor positions it is first necessary to acquire the National Scientific Qualification (ASN).¹ The ASN is meant to attest that an individual has reached the scientific maturity required for applying for a specific role (associate or full professor) in a given scientific discipline (Law dec. 30, n. 240, 2010, Art. 16); however, the qualification does not guarantee that a professorship position will eventually be granted.

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¹ The acronym ASN stands for *Abilitazione Scientifica Nazionale*. All acronyms used in this paper (e.g., ASN, MIUR, ANVUR) are based on the original (Italian) denomination, since they have a well established meaning for the Italian scientific community, while the expanded forms are in English for the benefit of international readers.

The Italian ASN is similar to other *habilitation* procedures already in place in other countries (e.g., France and Germany) in that it is a prerequisite for becoming a university professor. What makes the ASN peculiar is its reliance on bibliometry as one of the parameters used to evaluate applicants. Specifically, the Ministry of University and Research defined three quantitative indicators whose values were computed for each candidate. To grant qualification, examination committees should take into account how many indicators exceed previously computed thresholds. Such thresholds were defined as the medians of the values of those indicators for tenured professors.

The first round of the ASN started on November 2012 and completed in August 2014 with the publication of the last batch of results. Given the stagnating status of the Italian university system, the ASN represents the only opportunity for postdocs and temporary researchers to move towards a permanent position, and for tenured researchers and associate professors to move up the academic ladder. Therefore, it is not surprising that the ASN received 59,149 applications spanning 184 scientific disciplines. The curricula of all applicants, the values of their bibliometric indicators and the final reports of examination committees have been made publicly available for a short period of time. This provided an opportunity to analyze a nation-wide research assessment procedure involving a large number of applicants from all scientific areas.

The present work describes the results of the Italian ASN from a quantitative point of view. Specifically, we compute several statistics that provide a picture of the outcome of the qualification procedure. These statistics include: the fraction of successful qualifications, whether the values of bibliometric indicators are correlated with the outcome, whether those indicators have been used consistently across applicants, and whether the values of the quantitative indicators are correlated with the qualification result.

This paper is descriptive and aims at showing what happened in order to provide insights and draw attention to potential problems that require further investigation. Although we try to suggest possible explanations whenever appropriate, it is understood that only manual examination of the applicants' curricula and final reports may reveal whether the problems highlighted here are real issues. The ASN has been criticized by part of the Italian scientific community as a form of "career assessment by numbers" (using a term borrowed from Kelly and Jennions (2006)), due to its reliance on (ad-hoc) bibliometric indicators for individual evaluation. In this paper we try to avoid using numbers to explain what must be left to human judgment.

This paper is organized as follows. In Section 2 we provide the necessary background on the structure of the Italian university system and the National Scientific Qualification rules. In Section 3 we give a high level overview of the outcome of the ASN in terms of the number of applications and percentages of successful qualifications for each scientific area and discipline. Then, we turn our attention to the numerical indicators used to evaluate the applicants: the thresholds (medians) will be studied in Section 4, while the impact of the bibliometric indicators on the outcome of the qualification procedure will be analyzed in Section 5. Final discussion and concluding remarks are presented in Section 6.

2. The Italian National Scientific Qualification

2.1. Overview

Before 2010, there were three types of tenured research and teaching positions at Italian universities: assistant professor, associate professor and full professor. Law 240/2010 replaced the role of tenured assistant professor with two types of fixed term positions, called *Type A* and *Type B* researcher. *Type A* positions last for three years and can be extended once for two more years, while *Type B* positions last for three years with no provision for further extension. *Type A* positions are supposed to be a path towards becoming tenured associate professor, since universities hiring *Type A* researchers must allocate funding for promotion in advance.

Each professor and researcher is bound to a specific field of study, called Scientific Discipline (SD). When the ASN started, scientific disciplines were organized in 14 *scientific areas*, each one comprising several macro-sectors that were further divided into SDs. The 14 scientific areas are listed in Table 1; for each area we show its numeric ID, a three-letter acronym, the name and number of SDs it contains. Overall, 184 SDs were defined (DM 159, 2012a, Annex A); for completeness, they are listed in Appendix B. The aim and scope of each discipline is given in (DM 159, 2012a, Annex B). Each SD is identified by a four-character code of the form AA/MC where AA is the ID of the area the discipline belongs to (01–14), M is a single letter denoting the macro-sector, and C is a digit identifying the discipline within the macro-sector. For example, 01/B1 denotes Computer Science, 09/H1 denotes Computer Engineering and 11/A1 denotes Medieval History.

Each university can create new positions for a given SD and role (associate or full professor), provided that certain administrative and financial requirements are met. Once the position is advertised, only those that have acquired the ASN for that specific SD and role can apply. In this paper we use the term ASN to denote both the qualification procedure used to grant qualification, and the qualification itself. It is important to observe that a qualification does not, by itself, guarantee any position, but merely allows the owner to apply for a professorship; each university handles the hiring process according to locally defined rules.

The ASN is supposed to be held once a year. For each SD, the Ministry of University and Research (MIUR) appoints a five-member examination committee which is in charge of evaluating all applications, both at the full and associate professor levels. Committee members are randomly selected from a list of eligible professors. To be eligible, one has to satisfy quantitative requirements similar to those used for assessing applicants (see below). Each committee is made of four full professors from Italian universities, and one professor from a foreign university or research institution. Therefore, 920

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