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Doctoral studies in Portugal

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Abstract

Since the implementation of the Bologna reform in Portugal, there has been a significant increase in the number of doctoral graduates due to the establishment of formal doctoral programs. Before this, the doctorate was primarily awarded to higher education professors. However, since then, anyone who meets the requirements set out by the law can now obtain a doctorate. Despite the rise in the number of doctoral students, particularly among women, there is cause for concern as completion rates remain low. This could be attributed to minimal admission criteria, inadequate scholarship funding, and the reality that numerous doctoral students balance their studies with other professional obligations. Despite the low completion rate, many doctoral graduates struggle to find employment and end up in precarious situations.

Keywords
Doctoral Studies; Higher Education; University; Document Analysis; Portugal.

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Introduction

In 1290, the University was established in Lisbon, Portugal. It later moved to Coimbra and settled there permanently in 1537, following five relocations between the two cities. Once the first university was firmly established in Coimbra, a second university was needed to cater to the southern regions of the country. The University of Évora was thus founded. Évora was a strategic choice due to its status as the ecclesiastical metropolis and temporary home of the Court. Cardinal D. Henrique oversaw the construction of the University of Évora. He was interested in education and started by establishing the College of the Holy Spirit, which he entrusted to the newly founded Society of Jesus. He also requested Rome to convert the college into a university. With the consent of Pope Paul IV, the new University was created in 1559 (Veloso, 1949). The solemn inauguration took place on November 1st, which is still celebrated as University Day with the opening ceremony of the academic year.

At the time, the Portuguese university was part of the traditional counter-reformist framework of European Catholic institutions of higher education, most of which were controlled by the Jesuits (Rodrigues, 2015). The prestige of the university during its first two centuries resulted from the prestige and scientific quality of its professors.

Over time, despite the high value of individual professors, the education system as a whole was found to be outdated and not in line with the new European trends of the 18th century. This was true for most elites and cultural institutions in Iberia during that time (Serrão, 1983). Despite being restructured during the Pombalina reform in the 18th century by King José, the University of Coimbra remained archaic compared to its European counterparts.

In 1911, a higher education system was conceived and developed that served as the basis for educational policies during the First Republic (1911-1926) and which, to some extent, was continued during the Estado Novo dictatorship. In this context, the Universities of Lisbon and Porto were founded, and all the universities were given the autonomy and resources they needed to develop. This reality changed with the dictatorship that lasted from 1926-1974 (Torgal, 2000).

In the early 1970s, the Minister of Education, Veiga Simão, was able to get the Lines of Reform for Higher Education approved, despite the still nationalist and conservative political regime. This legislation enabled a new reform of the education system and, for the first time, introduced the concept of the democratization of education,

which was quite surprising. After this reform, more people started attending higher education, which gave rise to two distinct paths: the longer university path (undergraduate and postgraduate) and the path at higher polytechnic schools that offer shorter courses. This reform also led to the creation of three new universities (Universidade Nova de Lisboa, Universidade do Minho, and Universidade de Aveiro) and several higher education institutes across the country (Amaral & Tavares, 2015).

After the April Revolution in 1974, there were political upheavals that made it challenging to coordinate and stabilize the development model that was already in place. However, in 1976, the Constitution of the Portuguese Republic was approved. This introduced several provisions related to higher education, science, and culture. The most noteworthy ones were the autonomous status and the democratic election of representatives by their peers. In the 1990s, there were fourteen times more applicants to public education than available spots due to the *numerus clausus* principle (Torgal, 2000). This led to the creation of private institutions, which have no significant impact on higher education in Portugal, except for the Catholic University, which has become a benchmark.

In 2007, the RJIES (Legal System for Higher Education Institutions) was introduced, leading to the Rector and General Council becoming the main governing bodies of higher education. The Rector's competencies and power were greatly strengthened. After the international financial crisis in 2008 (and also for internal political reasons), due to the bailout's-imposed policies, the higher education sector underwent significant changes including budgetary restrictions and loss of institutional autonomy (Amaral & Tavares, 2015).

The Bologna reform was implemented in 2010, which brought changes to the duration of study cycles, with the doctoral degree being the most affected. The discussion focused on three issues: the nature of the doctorate (whether it is education or research training), the requirements for obtaining the doctorate, and the duration of the degree.

1. The doctorate degree

Significant changes in intellectual, social, and cultural aspects occurred in Europe during the 12th and 13th centuries. These changes led to the creation of new spaces for teaching and intellectual creation (Le Goff, 2014). Being a new organization, the University, had to find new words and terms to describe its functions and structures. The term "doctor" is

a perfect example of how a word can evolve its meaning over time. While initially, the universities used it with a sense similar to that of classical antiquity, it eventually came to denote a whole new concept, which was the 'degree of doctor.' According to Verger (2013), the doctorate became an official degree towards the end of the 13th century in prominent universities like Oxford, Bologna, and Paris. To obtain the highest title that a university could award, one needed to first obtain a teaching license (Carvalho, 2011). This license was required to become a doctor, which was considered the culmination of a university career and a sign of the highest intellectual competence. Achieving a doctorate meant that one had attained the peak of knowledge and excellence in a particular field. This achievement had significant implications for social representation, and as a result, the doctor's status and prestige were elevated (Verger, 1996). At this time, doctors were considered an exclusive and prestigious group with special privileges and social status resulting from a kind of "heavenly prestige" that gave them fame, power, and social dignity (Verger, 2013). Kouamé and Tournier (1998) also note that the importance of the faculty and subject matter further contributed to their social standing. By the 15th century, doctorates were becoming increasingly elitist, reserved only for the wealthiest, resulting in some cases in authentic 'family oligarchies' (Le Goff, 2014). As time passed, many doctors abandoned their original ideals and turned to other professions to make a living. This resulted in a decline in the reputation of the degree. In the 16th century, the privileges associated with the doctorate began to disappear, which resulted in a decrease in the number of students interested in pursuing this degree as it no longer carried many advantages over a regular degree. (Verger, 1996; 2013).

During the transformation of the university between the Middle Ages and the Modern Age, the degree of doctor was rethought due to the humanist movement (Rüegg, 1996). It was already in the Modern Age that the term "professor" became more commonly used to refer to individuals who held doctoral degrees and taught at universities. Despite the changes, the doctorate continued to emphasize intellectual development and cultural initiation. As a result, it was still granted certain privileges from the Middle Ages, although it remained very formal, solemn, and expensive. In Portugal, these privileges remained until the 19th century, with doctors being considered equivalents to noblemen and knights (Ribeiro, 2012).

During the 19th century, universities underwent a significant transformation, spearheaded by the German university and the ideas of Wilhelm von Humboldt (Rüegg, 2004). The connection between teaching and research became more apparent, along with

the increasing importance of the experimental method, which formed the foundation of the positivist mindset at that time (Abbagnano, 2000). From the 19th century onwards, it became necessary to present a thesis when obtaining a doctorate, a requirement that had already been in place since the end of the previous century. This format for awarding doctoral degrees was adopted by most European and American universities under the Humboldtian model. In contrast to the previous conception of the doctorate as a test with no exam value, modern doctoral theses were required to demonstrate scientific value and originality and be written in an objective and specialized way that adheres to the rules of the scientific method. (Klinge, 2004).

The production of knowledge and research was then considered a crucial global public good that plays a fundamental role in the development of countries and emerging world economies. This has led to a debate on whether applied research or fundamental research should be prioritized. Additionally, the definition and expectations of what a doctorate entails were still being shaped and adjusted to meet the changing demands of society and the paradigm shifts in the field. (Leydesdorff, 2006). The major transformation would only take place in the 21st century. Nowadays, the doctorate is still considered the highest point of a university career (Thomson & Walker, 2010) and is awarded all over the world to students who make an original contribution to knowledge under the guidance of one or more people who hold the degree (Teichler, 2011).

Doctoral students obtain the highest level of education and are primarily trained to conduct research. The qualification (International Standard Classification of Education -ISCED) is defined as an advanced research degree, achieved through study and research in both academic and professional fields. It requires the presentation of work that is of publishable quality and represents an original contribution to knowledge in a given area of study (OECD /Eurostat/UNESCO, 2015). In Portugal, the doctoral thesis followed this definition, and each candidate freely chose to be supervised by a professor (or more) who held the degree. Until then, the degree was primarily obtained by university lecturers and was compulsory for progression in the academic career (Simão, Santos, & Costa, 2005).

The doctorate outlined within the framework of the Bologna process was transformed into a 3rd cycle course lasting 3 years (180 ECTS). A new dynamic was initiated in student mobility and employability of graduates in the European area, following the trend of increasing globalization of education systems. The award of the degree of Doctor (Decree-Law nr. 74/2006 of March, 24th ; Decree Law nr. 115/2013 of August, 7th), is granted to students who demonstrate: (a) a systematic understanding of a

scientific field of study; (b) competences, skills and research methods associated with the scientific field; (c) the ability to conceive, design, adapt, and conduct significant research while complying with academic standards of quality and integrity; (d) the completion of a significant body of original research that expands knowledge, some of which merits national or international publication through a selection committee; (e) the capacity to critically analyze, evaluate and synthesize new and complex ideas; (f) the ability to communicate effectively with their peers, the academic community and society in general in their area of expertise; and finally, (g) the ability to promote technological, social or cultural progress in an academic and/or professional context in a knowledge-based society.

Doctoral programmes are generally linked to university research centers. Its operation depends on (compulsory) accreditation by the Higher Education Assessment and Accreditation Agency (A3ES) within the framework of the European quality assurance system. The program should primarily be aimed at guided learning for high-level R&D practice. It may include, when the respective regulations justifiably provide for it, the completion of curricular units aimed at research training and/or the development of complementary skills. In this case, the entire program is referred to as a doctoral course, and the conditions for waiving attendance on this course must be established (Decree-Law nr. 65/2018 of August, 16th).

To receive a doctoral degree, there are two possible requirements. The first is to create an original thesis that is specifically tailored to the field of study or specialty. The second option is to compile a cohesive and relevant body of research that has already been published in journals with selection committees of recognized international merit or, in the case of the arts, a unique project or set of achievements that demonstrate innovation. To meet this requirement, a written justification must be provided that explains the process of conception and development, research capabilities, and how the work fits into the overall evolution of knowledge in the field (Decree-Law nr. 63/2016 of September, 13th).

2. Method

This work aimed to map the evolution and development of the doctorate degree in Portugal. To fulfil this objective, we chose documentary analysis as our data collection methodology. Documentary analysis, according to Bardin (2008), is a scientific research

methodology that adopts certain technical and scientific procedures to examine and understand the content of documents of the most varied types to obtain the most significant information from them and a condensed representation of the information. In this study we used reliable databases from UNESCO, the Ministry of Science, Technology and Higher Education (DGEEC/ME-MCTES) and PORDATA (Francisco Manuel dos Santos Foundation - FFMS).

In terms of methodology, we followed three steps. First, we gathered information from the databases to select relevant documents. Second, we analyzed the documents from a longitudinal perspective to understand their temporal evolution. Lastly, we collected primarily quantitative data.

3. Doctoral studies in Portugal: evolution and current situation

The surge in doctoral graduates and government funding for publications is a direct response to the growing demands of the knowledge economy, economic development, and innovation. As we witness a continued uptick in doctoral graduates, it becomes increasingly important to consider the impact of doctoral studies on individuals, organizations, and society as a whole. (Halse & Mowbray, 2011). Higher education has expanded significantly, but research activity (measured by publications in indexed peer-reviewed journals) has been highly concentrated in the countries with the most developed economies for a long time (Europe and the USA).

Data from the World Bank dating back to 2010 provides global statistics on the attainment of doctorate degrees (World Bank, 2022). Before this year, there is no reliable data available for comparison of new doctorates awarded across different countries. However, since 2010, there has been a significant increase in the number of doctoral degrees awarded in countries with the most developed economies. The OECD reports that the average percentage of individuals aged between 25 and 64 with a doctorate has more than doubled in the two decades leading up to 2017, and increased by 25% between 2014 and 2019 (OECD, 2021a).

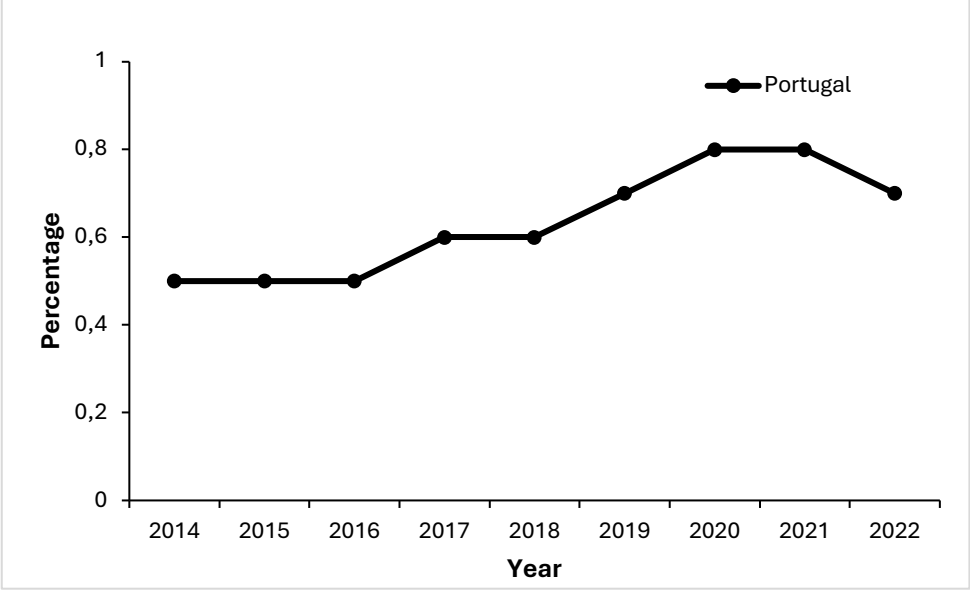
As long as governments continue to invest in doctoral education as a means of promoting international competitiveness, we can expect to see its expansion. This approach has resulted in a diversification of doctoral programs, with professional development doctorates offering career advancement opportunities in addition to traditional academic doctorates. This widening of the scope of doctoral training aims to

equip individuals for a range of careers, including those that cross disciplinary boundaries (Powell & Green, 2007).

As the number of individuals with PhDs continues to rise, the academic field is unable to accommodate all of them, leaving uncertainty regarding the labor market's ability to do so, particularly beyond academia. Consequently, the discussion regarding an excess of doctoral graduates has become unavoidable (OECD, 2021b). For those who are unable to secure a position in academia, transitioning to non-academic career paths can prove challenging. Moreover, in certain fields, the financial benefits of obtaining a doctorate are now either negative or comparable to those of a master's degree, which can be earned in a fraction of the time (Pedersen, 2016).

According to various studies published in recent years, the number of doctoral students has reached unprecedented levels in Portugal. The percentage of people with a doctorate increased by 69% in the 2014-2020 period (World Bank, 2022). The demand for the knowledge economy, economic growth, and innovation are incentives for expansion, reinforced by the government's financial incentives for universities to produce doctoral graduates and publications (Sarrico, 2022). As we can see in Figure 1, Portugal followed the trend of the vast majority of OECD countries and almost doubled the number of doctoral graduates between 2014 and 2020.

Figure 1: *Educational attainment, Doctoral or equivalent, population 25+, total (%) (cumulative)*



Note. Percentage of population ages 25 and over that attained or completed Doctoral or equivalent – Portugal. Source: UNESCO Institute for Statistics (UIS). UIS.Stat Bulk Data Download Service (https://data.worldbank.org/indicator/SE.TER.CUAT.DO.ZS?locations=PT-1W).

Table 1 highlights a concerning trend in Portugal's research and development investment from 2010 to 2022.

Table 1: Investment in research and development activities

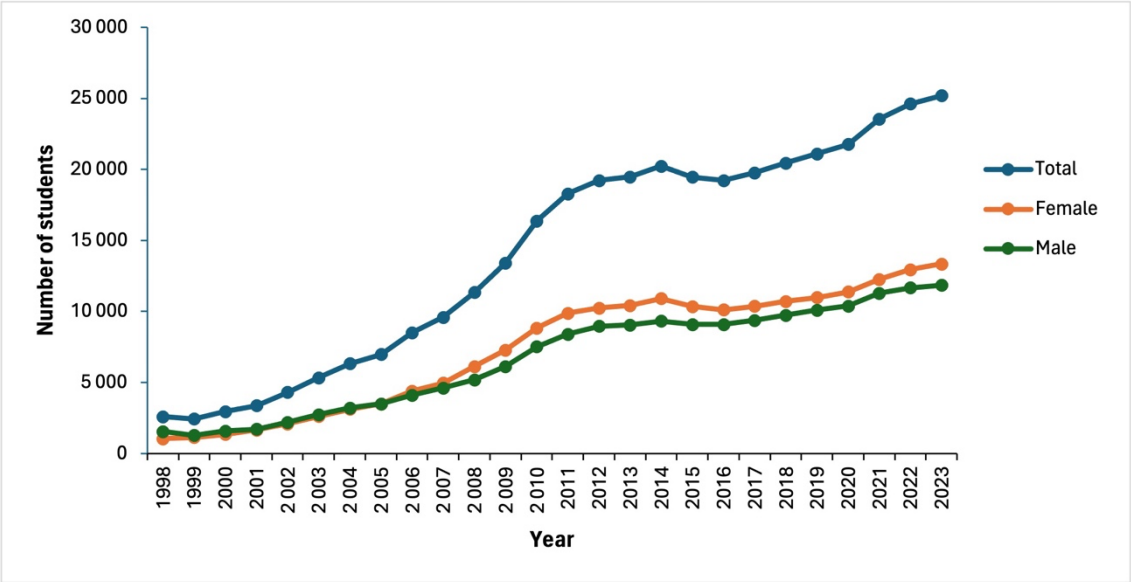
Year	Universities	State	Companies	Private organisations	Total
2010	1 016 624.3	196 287.9	1 266 296.1	278 346.3	2 757 554.6
2011	933 812.2	189 329.9	1 216 345.6	226 962.3	2 566 449.9
2012	846 000.6	124 224.3	1 153 332.2	196 575.7	2 320 132.8
2013	1 008 266.8	147 150.1	1 072 908.7	30 145.4	2 258 471.0
2014	1 018 024.6	139 833.3	1 035 966.2	38 424.8	2 232 248.9
2015	1 017 602.7	144 875.8	1 036 532.3	35 359.0	2 234 369.7
2016	1 068 139.6	125 527.1	1 156 466.1	38 334.2	2 388 466.9
2017	1 099 649.3	141 743.4	1 303 484.0	40 222.9	2 585 099.5
2018	1 152 721.4	147 037.5	1 424 577.6	44 735.7	2 769 072.3
2019	1 210 653.0	153 569.1	1 570 510.1	57 132.0	2 991 864.1
2020	1 165 111.8	160 139.0	1 843 559.2	67 402.2	3 236 212.1
2021	1 202 362.7	169 850.2	2 153 561.6	83 416.8	3 609 191.3
2022	1 284 191.4	176 048.5	2 566 389.3	97 495.2	4 124 124.4

Source: https://www.pordata.pt/portugal/despesas+em+atividades+de+investigacao+e+desenvolvimento+(i+d)+total+e+por+setor+de+execucao-1106-8984

Despite a notable increase in doctoral graduates, the funding for these activities within higher education institutions, private non-profit institutions, and public administration has remained disproportionately low. This raises important questions about the long-term sustainability of doctoral education and the professional opportunities available to those who complete it.

Regarding doctoral program enrolment (as shown in Fig. 2), a steady increase can be observed until 2014. The following years, from 2014 to 2016, saw a decline in numbers, which could be attributed to the financial crisis and the bailout. However, enrolment has since resumed its upward trajectory since 2017. Additionally, it is worth noting that there are presently more female students in these programs.

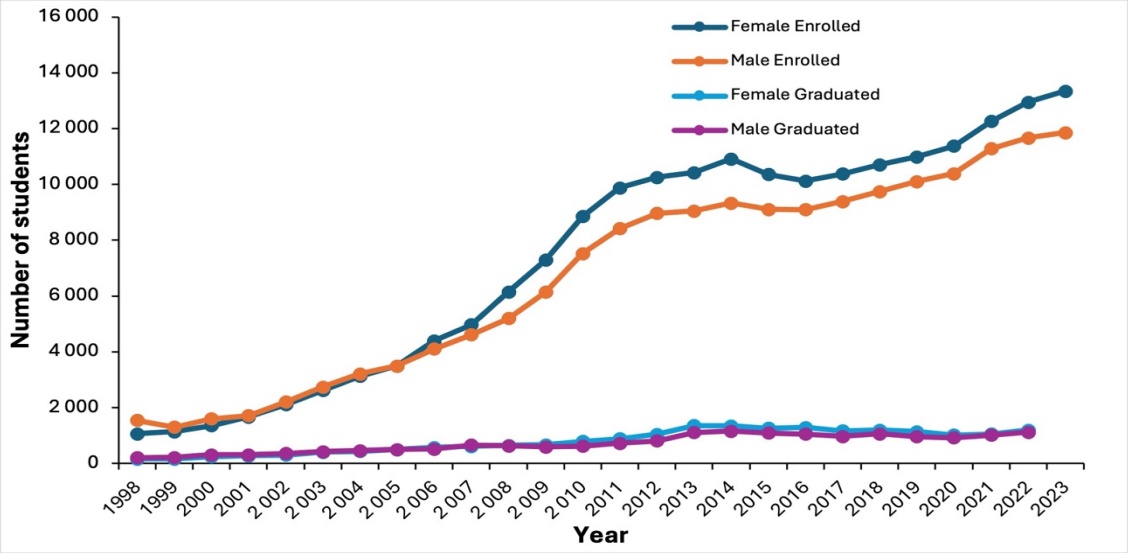
Figure 2: *Students enrolled in doctoral programs*



Source: DGEEC/ME-MCTES - RAIDES- Survey of Enrolled and Graduated Students in Higher Education, https://www.pordata.pt/portugal/alunos+matriculados+no+ensino+superior+total+e+por+nivel+de+formacao-1023

When comparing doctoral studies in Portugal to other OECD countries, it's evident that while there's a high rate of entry into these programs, the graduation rate doesn't reflect this (refer to Figure 3). Despite the impressive increase in doctoral qualifications, the survival rate for these studies remains low. As of 2022, there were approximately 24,000 doctoral enrolments, with about 6,000 being first-time enrolments. However, only approximately 2,000 students graduate each year, which is around a third of the total enrolment. Furthermore, the number of graduates per PhD student is declining, with 0.3 in 2021 compared to a peak of 0.7 in 2005 (PORDATA, 2023).

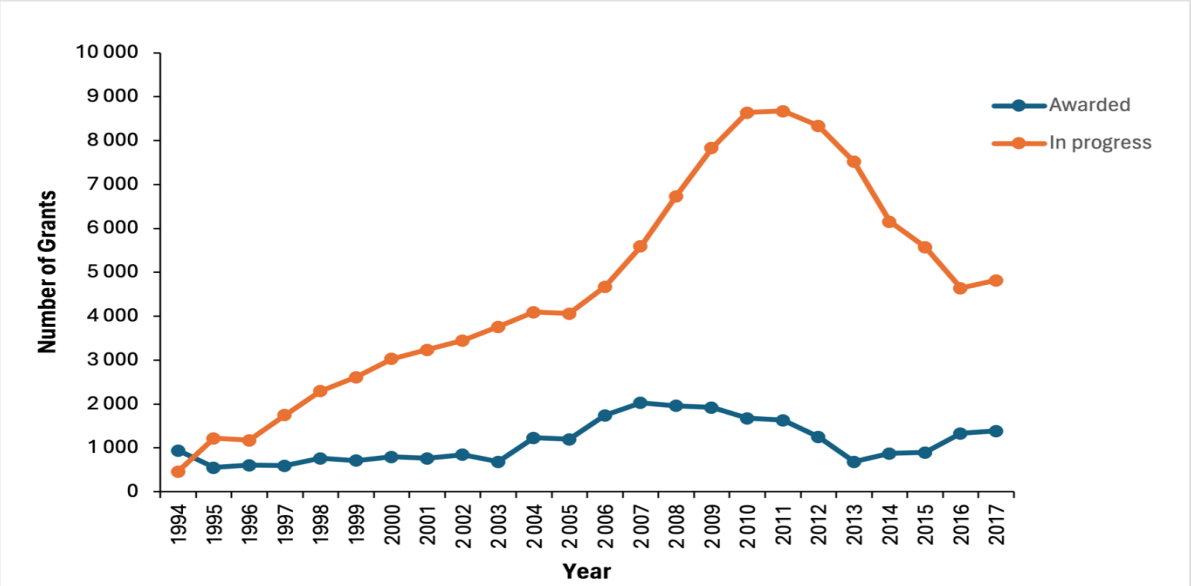
Figure 3: *PhD graduates by number of students enrolled in higher education*



Source: https://www.pordata.pt/subtema/portugal/diplomados+no+ano-42

The number of first-time PhD students has increased significantly. However, the Foundation for Science and Technology (FCT) has not been able to keep up with this growth by providing more scholarships (as shown in Figure 4). This lack of funding often leaves PhD students without the necessary financial support, which can contribute to a low completion rate

Figure 4: *PhD scholarships awarded/approved and in progress - FCT (1994 - 2017)*



Source: https://www.pordata.pt/portugal/bolsas+de+doutoramento+concedidas+aprovadas+e+em+execucao+++fct+(1994+++2017)-351

Based on the data provided, it seems there are notable issues with the effectiveness of doctoral-level training and that this situation has been worsening over time. This could potentially be attributed to a range of factors, including a diminished demand for admission to doctoral programs (resulting in students who are ill-equipped for the rigor required at this level of study), insufficient funding to complete the program (which could be compounded by other professional obligations), insufficient institutional resources to support doctoral students, and inadequate guidance from supervisors. Upon examining A3ES reports on a case-by-case basis, it becomes apparent that certain institutions have a notably high proportion of doctoral students concerning available supervisors. Silva and Sarrico (2023) suggest that this lower training effectiveness could be due to the prevalence of doctoral studies in Portugal in the arts, humanities, and social sciences compared to the sciences. In general, the field of sciences often involves a significant laboratory component that requires the presence of doctoral students working in teams. Typically, these students are younger. On the other hand, doctoral students in other fields tend to approach their studies more individually and may balance them with other professional activities. Additionally, these students are often older and may have family responsibilities. It is noteworthy to mention the challenging employment prospects that await those who complete a doctorate. In 2020, Portugal had 77 % of doctoral graduates working in higher education, one of the highest rates in the OECD (DGEEC, 2021).

To stimulate scientific employment, the government implemented a policy offering 6-year contracts to doctoral graduates. However, academia has struggled to integrate these graduates, leading to a high level of insecurity and limited prospects for continuity. As a result, over 50% of academic authors listed in the Scopus database in Portugal are on fixed-term contracts, making it one of the highest rates among OECD countries. (OECD, 2021). Beyond academia, the employment prospects for Ph.D. graduates appear to be limited, with only 13% finding work in public administration, 8% in private business, and 2% in the non-profit sector (DGEEC, 2021). Unfortunately, the available data does not reveal whether these doctoral graduates are using their research expertise or applying the advanced skills they acquired during their doctoral studies in their occupations. A national survey of doctoral graduates in 2020 found that 1 out of 5 under the age of 35 plan to relocate outside of Portugal in the next three years. (DGEEC, 2021).

Final considerations

In Portugal, doctoral degrees are awarded by universities. Each doctoral program must be previously approved by the Higher Education Assessment and Accreditation Agency (A3ES) and must be affiliated with a research unit that has received a favorable evaluation by the Foundation for Science and Technology (FCT).

Due to limited funding, most doctoral students are self-funded without any grants. The suboptimal efficacy of training raises concerns about their ability to meet the minimum competency requirements for conducting original research that contributes significantly to the advancement of knowledge and meets the quality standards necessary for publication. Additionally, many students juggle work commitments while pursuing their doctoral degree. Although Portugal has a higher proportion of students entering doctoral programs compared to other countries, the graduation rate remains lower.

The limited availability of career opportunities outside of academia presents a challenge in accommodating those with doctoral degrees. This has resulted in a "brain drain" to Europe and the US, negatively impacting innovation in business, public and social sectors. The available evidence indicates the need for a critical examination of the potential impact of increasing the number of doctoral students and the number of institutions that are authorized to award doctoral degrees. Such an expansion may have significant ramifications on the quality of doctoral education, as well as the career prospects of doctoral graduates. Therefore, it is important to conduct regular monitoring of the career trajectories of doctoral graduates to assess the effectiveness of their training and identify areas for improvement.

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