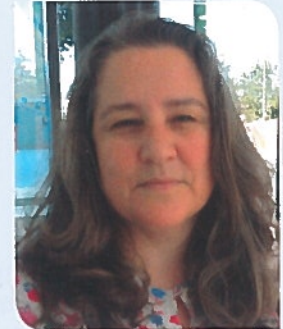


# CAREER PATTERNS FOR DOCTORATE HOLDERS IN PORTUGAL



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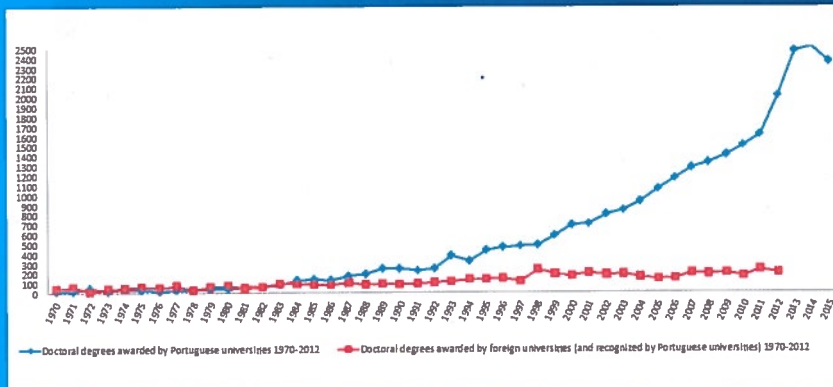
The number of doctorate holders in Portugal has gone up in the last decade, along with an increase in Portugal's scientific capacity and the trend since the late 1990s of catching up with other countries. We observe changes in the career patterns of doctorate holders, especially an increase in the number of those working in private firms, which still remains low when compared with other countries. As Portugal's higher education system matures and a lower number of new doctorate holders are absorbed, there is more availability of these qualified resources in the labour market, leading to changes in career patterns.

## EVOLUTION OF DOCTORATES IN THE POPULATION

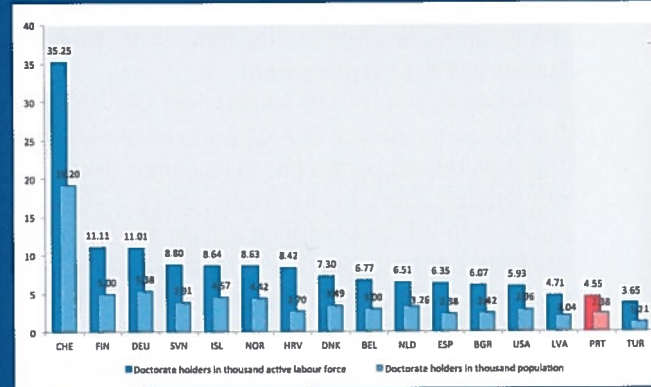
Critical mass is vital for the creation and dissemination of knowledge, and attaining that critical mass is of utmost importance both for developed and developing countries. In Portugal, the training of the working population has evolved in the last four decades, accompanied by the legal reform of the tertiary education system and a significant increase in public investment in science and technology.<sup>1</sup> Science policy has been directed at attaining higher levels of critical mass, which has resulted in a significant increase in the generation of qualified

human resources, and in the capacity to train individuals at the doctoral level. Figure 1 shows the yearly number of doctoral degrees that were awarded and recognised by Portuguese universities from 1970 to 2012/15. The number of new doctorate holders has increased from 23 in 1970, to 250 in 1990 and to 694 in 2000. In 2015, 2,351 obtained new doctoral degrees, of which 55.5% were female.

In 2012, there were 24,992 doctorate holders living in Portugal, which corresponds to 0.24% of the population. The share of women obtaining a doctoral degree reached that of males in 2008, and has been increasing ever since. Today more women



**Figure 1.** Evolution of doctoral degrees obtained in Portuguese universities and abroad, 1970-2012/15  
(Source: DGEEC-Higher Education Statistics)



**Figure 2.** Number of doctorate holders in the population – International Comparison – 2012  
(Source: DGEEC-Career Development of Doctorate Holders (CDH))

<sup>1</sup> Heitor, M., Horta, H., & Mendonça, J., 2013, 'Developing human capital and research capacity: science policies promoting brain gain', *Technological Forecasting & Social Change*, 82, pp. 6-22.

earn a doctorate than men. This increase in female representation shows a shift in the pattern of doctorates in Portugal.

It is clear that Portugal has tremendously increased the ability to produce doctorate holders and the number of doctoral degrees. Nevertheless, when compared with most European countries, Portugal still produces a low number. Figure 2 shows the amount of doctorate holders per one thousand in the total population and in the working population for a group of countries. Here, Portugal is among the countries with the lowest number of doctorate holders in the working population.

### CAREERS OF DOCTORATE HOLDERS

In 2012, 94% of the total doctorates living in Portugal were employed, and most of them were employed in the higher education sector. The lowest share was in the business sector. This pattern is different from what is observed in other countries, such as the Netherlands, where the share of doctorate holders working in companies in 2012 was 34%, a number similar to that of Belgium and Denmark.<sup>2</sup>

A growing body of literature suggests that the time when a doctoral degree almost automatically led to a long-lasting academic career is over, and researchers increasingly find themselves competing for jobs in the non-academic labour market.<sup>3</sup> In Portugal, careers of doctorates have been until now centred on academia, and the number of doctorate holders in private firms is lower than in most countries. This difference may be a result of the activities and level of complexity of firms, the level of R&D activities, and the type of firms hiring doctorate holders. Accordingly, the CDH results show that a low number of doctorate holders in firms were performing R&D activities, and that many individuals move away from firms to find positions where they can perform R&D-related activities. Consequently, 52% of doctorate holders moving out of private firms go to the higher education sector.

Nevertheless, results show that Portugal has been able to attract qualified human resources in the last decade. Science policies, which emphasise the advanced qualification of human resources, democratise the access to science, and internationalise the science base, helping to build the necessary conditions to drive brain gain over time. Figure 4 shows the origins of doctorate holders, which indicates the level of brain circulation of PhDs in and out of Portugal.

In 2012, Portugal had 3,903 doctorate holders living and working in the country who obtained their degrees in foreign universities. Of these, 2,631 doctorate holders have Portuguese nationality and 1,272 a foreign nationality. In the same year, Portugal sent 1,844 doctorate holders to other countries, 937 of whom had Portuguese nationality and 907 of whom were foreigners. These data reveal that the flow between brain gain and brain drain resulted in a positive balance of 2,059 doctorate holders. This pattern is similar to what was obtained in 2009, revealing that Portugal has the capacity to attract talent and employ doctorates.

### CONCLUSION

In Portugal the number of doctorate holders has increased significantly in the last 20 years. However, the number of doctorates in the population is still lower than in most European countries. Most doctorate holders work in the higher education sector, and there is a low penetration of these highly-qualified human resources in private companies. Nevertheless, Portugal has managed to retain capacity and have a positive flow of doctorates despite the crisis. Given this perspective, there is still room for increasing and diversifying career patterns of doctorate holders in Portugal. Observation of this process is key for the definition of public policy.

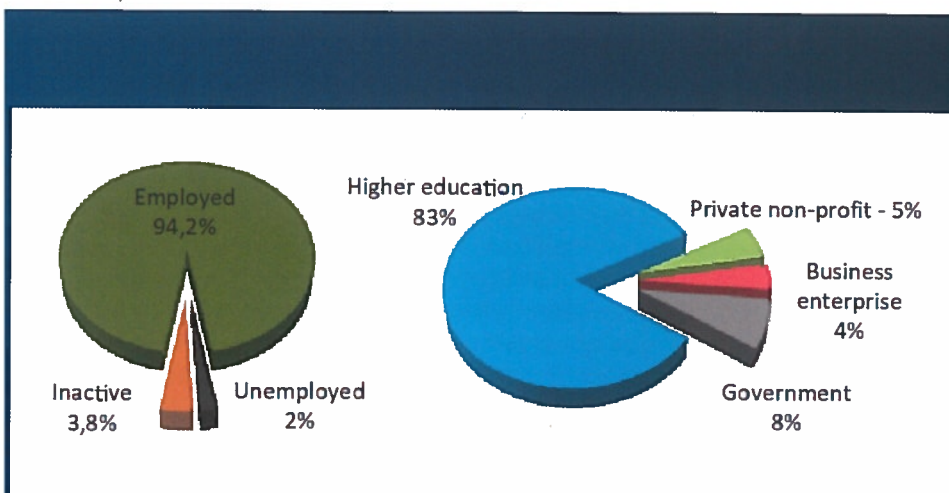


Figure 3. Patterns of employment of doctorates in Portugal – 2012 (Source: DGEEC-CDH)

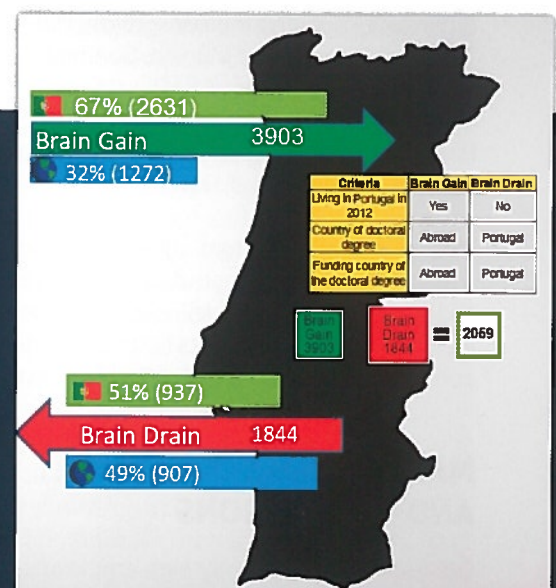


Figure 4. Brain circulation of PhDs – 2012 (Source: DGEEC-CDH)

<sup>2</sup> Duarte, J., & Mendonça, J., 2016, 'Determinant of Careers patterns for Doctorate holders', in Gokhberg, L., Shmatko, N., & Auriol, L. (eds.) *The Science and Technology Labor Force: The Value of Doctorate Holders and Development of Professional Careers* (Switzerland: Springer International Publishing).

<sup>3</sup> Levecque, K., Baute, S., & Anseel, F., 2013, *Junior researchers in Flanders 2013: on dreams and realities*. ECOOM – Centre for R&D Monitoring, Belgium.