

Can You Afford to Research? The Financial Strain of Ph.D. students in Spain

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Abstract

This study examines the financial challenges affecting the decline in Ph.D. candidates and completions in Spain, focusing on Ph.D. scholarships and rising living costs. Using government data, we analyse FPU and PIF scholarships compared to national salaries, inflation, and housing affordability in recent years. We find that scholarships are significantly below national salary averages, with housing costs often unaffordable. Financial strain, worsened by limited scholarship increases, contributes to low doctoral completion rates and reduced interest in academic careers. We conclude that current funding is insufficient, pushing Ph.D. candidates towards better-paying jobs outside academia. Policy reforms are needed to provide adequate support and sustain the academic workforce.

1 Introduction and Background

Recent discourse within academia suggests a growing concern over the declining number of Ph.D. candidates and interest in pursuing long-term academic careers leading to positions such as Associate or Full Professors. According to the official statistics from the Spanish Government [4], there has been a significant decrease in the number of Ph.D. defenses in Spain annually—from 20,149 in 2016 to 11,259 in 2022 (detailed information in Appendix A). This trend raises critical questions about the factors influencing doctoral candidates' decisions to pursue and complete their studies. One potential factor is the increasing cost of living in Spain and its impact on Ph.D. students' financial well-being.

In Spain, two primary government-funded scholarships support Ph.D. studies: the Formación de Profesorado Universitario (FPU) and the Personal Investigador en Formación (PIF) [3] providing a four-year salary. The main distinction lies in their award processes: FPU scholarships are granted directly to students based on academic merit, while PIF scholarships are tied to specific research projects funded by the National Research Plan, with candidates selected by the project's Principal Investigator. The FPU scholarship is an annual funding program provided by the Ministerio de Universidades. To apply, a student must collaborate with a professor to jointly propose a Ph.D. project. Scholarships are awarded based on a competitive evaluation that allocates points to several criteria: project quality (0.5 points), the student's curriculum vitae (2 points), the professor's curriculum vitae (2.5 points), the research excellence of the research group (1 point), and the student's academic

record (4 points). This scoring system places significant emphasis on academic grades, making the scholarships highly competitive. As depicted in the 2022 call [9], there were 2,614 valid applications for only 900 available scholarships considering that eligibility requires meeting challenging academic criteria. Previous studies have examined the impact of these funding programs on doctoral success rates. In [1], the authors analysed data from 2002 to 2005 involving 7,770 scholarships and found an average success rate of 40%. A notable proportion of fellows also renounced their scholarships due to better employment opportunities during their Ph.D. studies. Another study [13] further supported these findings by concluding that Ph.D. holders working outside academia had better working conditions, including contract type, working hours, and salary.

However, these studies have not analysed the role of economic precarity in Ph.D. success rates. Specifically, there is a lack of research on how FPU and PIF salaries compare to the inflation rates and housing costs in major university cities. This study aims to fill that gap by analysing the FPU and PIF salaries relative to the cost of living in Spain from 2013 to 2023, upon data availability.

2 Methodology

This study analysed data from authoritative sources, primarily the Data Catalogue of the Ministry of Science, Innovation, and Universities of Spain [5]. From this source, we obtained the gross annual salaries for the FPU and PIF scholarships for all relevant years. Notably, the FPU scholarship offers different salary amounts for each of the four years of the fellowship. To facilitate straightforward comparisons across years and between the two scholarship programs, we calculated the gross annual salary by averaging the salaries over the four-year duration of the fellowship. To analyse them in relation to the cost of living, we considered two key parameters: the Consumer Price Index (Índice de Precios al Consumo, IPC) and rental housing costs.

The IPC, an economic indicator measuring average changes in consumer prices over time and reflecting inflation, was extracted from the National Institute of Statistics (INE) [8]. Additionally, we included a comparison of Ph.D. scholarship salaries to the mode and mean salaries in Spain [7] which is limited to 2021.

To analyse rental housing costs, we utilised data from the Idealista [12], a widely used real-state platform in Spain. Idealista provides annual reports detailing monthly average rental costs per square meter in major Spanish cities. The methodology employed by this portal to generate these reports includes the following steps: i) Selection and cleaning of listings: Identifying relevant rental property listings and removing anomalous or out-of-market data

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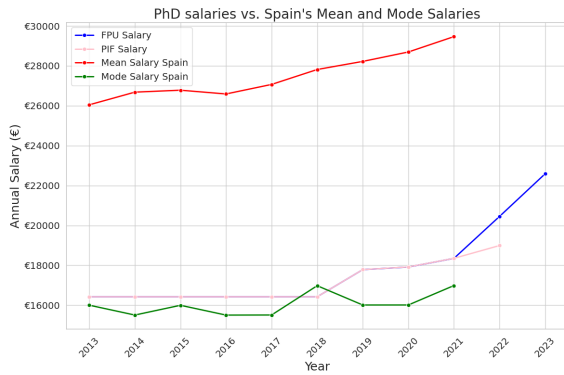


Figure 1: FPU and PIF salaries evolution in comparison to mean and mode in Spain.

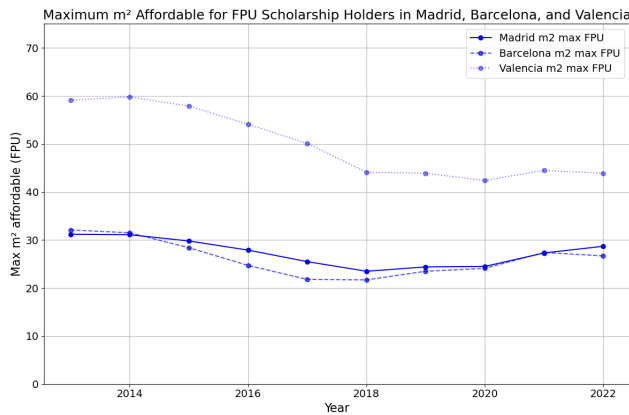


Figure 2: Maximum affordable living space per city based on 30% of the FPU gross salary

through statistical analysis; ii) Calculation of average prices: Computing average rental prices in both well-defined (final) and broader (non-final) geographic areas; iii) Data validation and correction: Assessing data robustness and correcting any remaining anomalies in the time series. We focused on rental prices in Madrid, Barcelona, and Valencia, which host the most universities in Spain according to the Ministry of Universities. In addition to housing prices, we considered that rent should not exceed 30% of one’s salary, following standard financial guidelines in Spain. Rental insurance companies often decline rentals if the rent exceeds 30% of income.

By assessing Ph.D. salaries relative to living costs and national salary data, we evaluated the financial pressures faced by Ph.D. students in Spain.

3 Results

In this section, we present the findings on the financial situation of Ph.D. students in Spain, focusing on comparisons between scholarship salaries and various economic indicators such as national salaries, housing affordability, and inflation rates.

Fig. 1 compares FPU and PIF scholarship salaries to Spain’s mean and mode salaries from 2013 to 2023. Both scholarships remain significantly below the mean salary, with a notable increase only starting in 2019. Despite gains, the gap against the mean salary remains large, indicating limited financial support for recipients. While FPU and PIF salaries are similar to the modal salary, it’s important to consider that pursuing a Ph.D. requires higher education. However, in 2023, only 38.8% of men and 32.1% of women aged 25 to 64 in Spain have higher education qualifications [6] indicating that the majority of the population, whose salaries contribute to the calculation of the modal salary, do not possess higher education degrees.

In Fig. 2 the number of square meters an individual can afford to rent with the FPU scholarship in three major cities from 2013 to 2022 is shown (detailed analysis for PIF is available at Appendix A). This calculation is based on dedicating 30% of the salary to rent and utilising the average rental prices per square meter in each city. Fig. 2 reveals that, despite receiving the same salary across all three cities, the affordability of housing varies significantly due to regional differences in rental prices. Valencia’s lower housing costs allow FPU recipients to afford a substantially larger living space compared to Madrid and Barcelona. In contrast, the higher rental prices in Madrid and Barcelona, which concentrate the number of universities in Spain, result in smaller affordable living areas for Ph.D. students.

Fig. 3 displays the annual percentage changes of both FPU and PIF salaries in comparison to the annual rate of change in the IPC. Between 2013 and 2015, the IPC decreased while the nominal salaries remained constant, resulting in an increase in real salaries. From 2016 to 2018, salaries remained unchanged, but the IPC increased significantly, leading to a reduction in the real salaries. From 2018 to 2023, the salaries increased at rates exceeding those of the IPC, indicating growth in real salaries during this period.

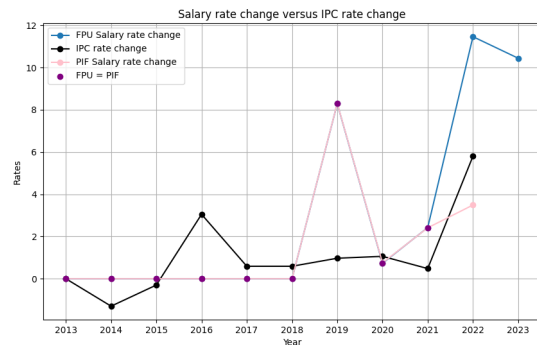


Figure 3: Percentage rate changes in FPU and PIF salaries versus IPC over time

These findings provide a detailed overview of the economic conditions affecting Ph.D. students in Spain. The analyses illustrate the disparities between scholarship salaries and national salary averages, the impact of regional housing costs on affordability, and the relationship between salary adjustments and inflation over the past decade.

4 Discussion and Conclusion

Figure 1 shows that Ph.D. salaries in Spain are nearly equivalent to the modal salary of the general population. While the INE does not provide modal salary data segmented by education level, a 2022 survey¹ indicates that individuals with at least a university education—a prerequisite for Ph.D. studies—reported a mean salary of €32,722.61. This amount exceeds any of the Ph.D. stipend figures presented in Figure 1. However, this average encompasses professionals across all levels of seniority, which may not accurately represent the earnings of recent graduates or early-career individuals comparable to Ph.D. students. Ideally, Ph.D. stipends should be compared to the salaries of individuals with higher education in their first one to two years of employment; unfortunately, such specific data is not readily available in the literature. This significant salary disparity may prompt candidates to leave academia for better-paying industry jobs. Although Figure 1 compares the FPU and PIF salaries with the mean and modal salaries in Spain—acknowledging that many of these salaries pertain to positions not requiring higher education—we want to emphasize that all occupations, regardless of educational requirements, are equally important. Our primary objective with this comparison is to demonstrate that the salaries offered in academia may not provide adequate working conditions, potentially causing individuals to seek employment outside the university setting.

Our analysis (Figs. 2) reveals that, given the legal minimum living spaces—25m² in Madrid [10], 36m² in Barcelona [2], and 24m² in Valencia [14]—only in Valencia could scholarship holders afford legal housing; in Barcelona and, during 2017–2020 in Madrid, they would be forced to share accommodations due to unaffordable rents.

While Ph.D. salaries remained static from 2013 to 2018 (Fig. 3) under the Partido Popular's government, they have increased since 2019 under the coalition of Partido Socialista Obrero Español (PSOE) with Podemos (2020–2023); however, these increases have not kept pace with substantial housing cost rises, leaving scholarships insufficient to cover living expenses regardless of the government.

A limitation of our study is its reliance on government data, which, while accessible in Spain, may not be available or comparable in other countries, potentially limiting the generalizability of our findings. Future research should explore how economic precarity affects later academic career stages and whether the decline in Ph.D. student numbers correlates with reduced university faculty, potentially impacting the quality of higher education.

Building on previous findings of high Ph.D. abandon rates due to candidates shifting to industry [1, 11, 13], our study may support that inadequate Ph.D. salaries and unaffordable housing make academia an unsustainable career path, rendering public scholarships insufficient to support research in Spain.

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¹<https://www.ine.es/jaxiT3/Datos.htm?t=36831>

A Appendix: Additional Data

This appendix provides supplementary information on the economic context for Ph.D. students in Spain. The data presented here offers insights into the recent trends in doctoral completions and the financial constraints that students face, specifically regarding housing affordability and salary sufficiency.

A.1 Analysis of the defended Ph.D. Thesis

The Table 1 shows a significant decline in the number of successfully defended Ph.D. theses in Spain from 2015 to 2022. After a peak of over 20,000 in 2016, there was a marked decrease in completions, hitting a minimum of 8,483 in 2018. Despite a slight recovery in subsequent years, the numbers remained below earlier levels, reflecting challenges in doctoral retention and completion. This trend may be influenced by financial constraints, as explored in the main document.

Table 1: Number of Successfully Defended Ph.D. Theses in Spain (2015–2022)

Year	2015	2016	2017	2018	2019	2020	2021	2022
#Thesis	14,694	20,049	17,286	8,483	10,165	9,031	11,344	11,259

A.2 Maximum affordable houses for PIF scholarships

Figure 4 provides insight into the regional variations in housing affordability for PIF scholarship holders. Based on a 30% rental budget allocation, the figure shows that students in Valencia could afford substantially more living space than those in Madrid and Barcelona. This difference is attributed to the lower average rental prices per square meter in Valencia. Over the years, housing affordability in all three cities has decreased, with the maximum affordable space for PIF recipients gradually shrinking, especially in Barcelona and Madrid. This highlights the economic constraints faced by Ph.D. students in high-rent cities, where most universities are concentrated, where limited affordable housing options may impact their quality of life and overall well-being.

A similar graphic for the FPU scholarship is presented in the main text. Given that FPU and PIF salaries were identical or nearly identical from 2013 to 2021, both follow similar patterns in terms of housing affordability. Therefore, we chose to analyse only one (FPU) in the main text, with the PIF data provided here for reference.

A.3 Salary dedicated to the rent for FPU and PIF scholarships

Figure 5 illustrates the financial pressure placed on Ph.D. students by housing costs. The plot compares the FPU and PIF scholarship holders' rent budgets based on a 30% salary allocation. Up until 2018, both scholarships allowed for only minimal increases in rental spending, despite growing rental costs. From 2020 onward, the FPU salary saw a notable increase, providing a slightly higher budget for rent. However, the PIF scholarship lagged, leaving recipients with a more constrained budget for housing. This disparity underscores the limited flexibility Ph.D. students have in managing housing costs within their salaries.

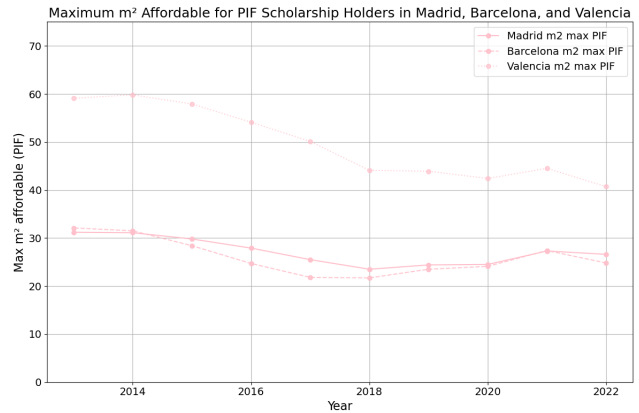


Figure 4: Maximum affordable living space (m²) per city based on 30% of the PIF salary

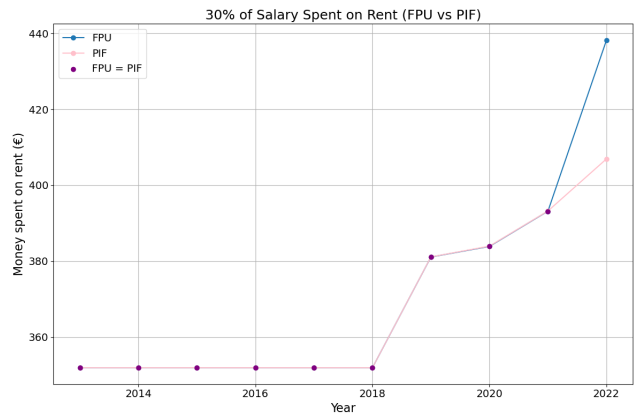


Figure 5: Amount of salary dedicated to rent according to the 30% rule for FPU and PIF recipients.

As of the last available data in 2022, the maximum amount that Ph.D. students on scholarships could allocate to rent under the 30% rule was under €440 for FPU and under €410 for PIF recipients. However, a recent search on the Idealista portal (taking into consideration that two years have passed and housing costs have risen further) shows no rental options in Madrid or Barcelona below €450. In Valencia, only two listings fall below this threshold: one at €400 per month for a 24-square-meter apartment, which is barely above the legal minimum, and another at €450 for a 15-square-meter apartment, which is not only unaffordable but also fails to meet legal size requirements.